**** WARNING ** WARNING ** WARNING ** WARNING ****
This document is intended for informational purposes only.

Users are cautioned that California Department of Transportation (Department) does not assume any liability or responsibility based on these electronic files or for any defective or incomplete copying, exerpting, scanning, faxing or downloading of the contract documents. As always, for the official paper versions of the bidders packages and non-bidder packages, including addenda write to the California Department of Transportation, Plans and Bid Documents, Room 0200, P.O. Box 942874, Sacramento, CA 94272-0001, telephone (916) 654-4490 or fax (916) 654-7028. Office hours are 7:30 a.m. to 4:15 p.m. When ordering bidder or non-bidder packages it is important that you include a telephone number and fax number, P.O. Box and street address so that you can receive addenda.

STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

NOTICE TO CONTRACTORS
INSTRUCTIONS TO BIDDERS
GENERAL CONDITIONS

AND

SPECIAL PROVISIONS

FOR BUILDING CONSTRUCTION ON
STATE HIGHWAY ROUTE 38
IN

SAN BERNARDINO COUNTY IN ANGELUS OAKS

AT THE CAMP ANGELUS MAINTENANCE STATION 37710 HWY 38

CONTRACT NO. 08-479504

08-SBd-5708

Bids Open: June 2, 2005
Dated: May 9, 2005

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DEPARTMENT OF TRANSPORTATION

NOTICE TO CONTRACTORS

CONTRACT NO. 08-479504

08-SBd-5708

Sealed proposals for the work shown on the plans entitled:

STATE OF CALIFORNIA; DEPARTMENT OF TRANSPORTATION; PROJECT PLANS FOR BUILDING CONSTRUCTION ON STATE HIGHWAY ROUTE 38 IN SAN BERNARDINO COUNTY IN ANGELUS OAKS AT THE CAMP ANGELUS MAINTENANCE STATION 37710 HWY 38

will be received at the Department of Transportation, 3347 Michelson Drive, Suite 100, Irvine, CA 92612-1692, until 2 o'clock p.m. on June 2, 2005, at which time they will be publicly opened and read in Room C - 1116 at the same address.

Proposal forms for this work are included in a separate book entitled:

STATE OF CALIFORNIA; DEPARTMENT OF TRANSPORTATION; PROPOSAL AND CONTRACT FOR BUILDING CONSTRUCTION ON STATE HIGHWAY ROUTE 38 IN SAN BERNARDINO COUNTY IN ANGELUS OAKS AT THE CAMP ANGELUS MAINTENANCE STATION 37710 HWY 38

General work description: Upgrade maintenance facilities

Bidders are urged to obtain disabled veteran business enterprise (DVBE) participation on this project, although there is no specific project goal for DVBE participation.

No prebid meeting is scheduled for this project.

Bids are required for the entire work described herein.

At the time this contract is awarded, the Contractor shall possess either a Class B license or a combination of Class C licenses which constitutes a majority of work.

The Contractor must also be properly licensed at the time the bid is submitted, except that on a joint venture bid a joint venture license may be obtained by a combination of licenses after bid opening but before award in conformance with Business and Professions Code, Section 7029.1.

This contract is subject to state contract nondiscrimination and compliance requirements pursuant to Government Code, Section 12990.

Preference will be granted to bidders properly certified as a "Small Business" as determined by the Department of General Services, Office of Small Business and Disabled Veteran Business Enterprise Certification (OSDC), at the time of bid opening in conformance with the provisions in Section 2-1.05, "Small Business Preference," of the special provisions, and Section 1896 et seq, Title 2, California Code of Regulations. A form for requesting a "Small Business" preference is included with the bid documents. Applications for status as a "Small Business" must be submitted to the Department of General Services, Office of Small Business and Disabled Veteran Business Enterprise Certification, 707 Third Street, West Sacramento, CA 95605, Telephone Nos. (800) 559-5529 or (916) 375-4940.

A reciprocal preference will be granted to "California company" bidders in conformance with Section 6107 of the Public Contract Code. (See Divisions 2 and 3 of the special provisions.) A form for indicating whether bidders are or are not a "California company" is included in the bid documents and is to be filled in and signed by all bidders.

Inquiries or questions based on alleged patent ambiguity of the plans, specifications or estimate must be communicated as a bidder inquiry prior to bid opening. Any such inquiries or questions, submitted after bid opening, will not be treated as a bid protest.

Bidder inquiries may be made as follows:

The Department will consider bidder inquiries only when completed "Bidder Inquiry" form is submitted. A copy of the "Bidder Inquiry" form is available on the Internet at the address shown below. Submit "Bidder Inquiry" forms to:

Department of Transportation
Construction Program Duty Senior
464 West 4th Street, 6th Floor, CCO/Pre-Bid Inquiry Desk
San Bernardino, CA 92401-1400

Fax Number: (909) 383-6739
http://www.dot.ca.gov/dist8/construction

To expedite processing, submittal of "Bidder Inquiry" forms via internet is preferred.

To the extent feasible and at the discretion of the Department, completed "Bidder Inquiry" forms submitted for consideration will be investigated, and responses will be posted on the Internet at:

http://www.dot.ca.gov/dist8/construction

The responses to bidder's inquiries, unless incorporated into formal addenda to the contract, are not part of the contract and are provided for bidder's convenience only. In some instances, the question and answer may represent a summary of the matters discussed rather than a word-for-word recitation. The availability or use of information provided in the responses to bidder's inquiries is not to be construed in any way as a waiver of the provisions of Section 1-1.03 of the Instructions to Bidders or any other provision of the contract, the plans, General Conditions, Instructions to Bidders or Special Provisions, nor to excuse the contractor from full compliance with those contract requirements. Bidders are cautioned that subsequent to responses or contract addenda may affect or vary a response previously given.

Project plans, special provisions, and proposal forms for bidding this project can only be obtained at the Department of Transportation, Plans and Bid Documents, Room 0200, MS #26, Transportation Building, 1120 N Street, Sacramento, California 95814, FAX No. (916) 654-7028, Telephone No. (916) 654-4490. Use FAX orders to expedite orders for project plans, special provisions and proposal forms. FAX orders must include credit card charge number, card expiration date and authorizing signature. Project plans, special provisions, and proposal forms may be seen at the above Department of Transportation office and at the offices of the District Directors of Transportation at Irvine, Oakland, and the district in which the work is situated.

The successful bidder shall furnish a payment bond and a performance bond.

Pursuant to Section 1773 of the Labor Code, the general prevailing wage rates in the county, or counties, in which the work is to be done have been determined by the Director of the California Department of Industrial Relations. These wages are set forth in the General Prevailing Wage Rates for this project, available at the Labor Compliance Office at the offices of the District Director of Transportation for the district in which the work is situated, and available from the California Department of Industrial Relations' Internet Web Site at: http://www.dir.ca.gov. Future effective general prevailing wage rates which have been predetermined and are on file with the Department of Industrial Relations are referenced but not printed in the general prevailing wage rates.

DEPARTMENT OF TRANSPORTATION

Deputy Director Transportation Engineering

Dated May 9, 2005

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STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

INSTRUCTIONS TO BIDDERS
AND
GENERAL CONDITIONS
FOR
BUILDING CONSTRUCTION

JANUARY 2002

Issued by

DEPARTMENT OF TRANSPORTATION

INSTRUCTIONS TO BIDDERS

SECTION 1

PROPOSAL REQUIREMENTS AND CONDITIONS

1-1.01 GENERAL

- The bidder shall carefully examine the instructions contained herein and shall be satisfied as to the conditions with which the bidder must comply prior to bid and to the conditions affecting the award of contract.
- These instructions form a part of the contract documents.
- Attention is directed to Section 1-1.01, "General," of the General Conditions regarding the use of masculine gender pronouns in these Instructions to Bidders.

1-1.02 CONTRACTOR'S LICENSING LAWS

- Attention is directed to the provisions of Chapter 9 of Division 3 of the Business and Professions Code concerning the licensing of contractors.
- All bidders and contractors shall be licensed in conformance with the laws of this State and any bidder or contractor not so licensed is subject to the penalties imposed by those laws.
- Attention is also directed to the requirements in Public Contract Code Section 10164. In all projects where Federal funds are involved, the Contractor shall be properly licensed at the time the contract is awarded.

1-1.03 EXAMINATION OF PLANS, SPECIAL PROVISIONS AND SITE OF THE WORK

- The bidder shall examine carefully the site of the work contemplated, the plans and special provisions and these instructions to bidders and contract forms therefor. The submission of a bid shall be conclusive evidence that the bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality, and scope of work to be performed, the quantities of materials to be furnished, and as to the requirements of these instructions to bidders, plans, special provisions, and the contract.
- Where the Department has made investigations of site conditions, including subsurface conditions in areas where work is to be performed under the contract, bidders or Contractors may, upon written request, inspect the records of the Department as to those investigations subject to and upon the conditions hereinafter set forth.
- Where there has been prior construction by the Department or other public agencies within the project limits, records of the prior construction that are currently in the possession of the Department and which have been used by, or are known to, the designers and administrators of the project will be made available for inspection by bidders or Contractors, upon written request, subject to the conditions hereinafter set forth. Those records may include, but are not limited to, as-built drawings, design calculations, foundation and site studies, project reports and other data assembled in connection with the investigation, design, construction and maintenance of those prior projects.
- Inspection of those records of investigations and project records may be made at the office of the district in which the work is situated, or in the case of records of investigations related to structure work, at the Transportation Laboratory, Sacramento, California. The records of investigations and project records are not a part of the contract and are available solely for the convenience of the bidder or contractor. It is expressly understood and agreed that the Department assumes no responsibility whatsoever in respect to the sufficiency or accuracy of the investigations thus made, the records thereof, or of project records, or of the interpretations set forth therein or made by the Department in its use thereof and there is no warranty or guaranty, either express or implied, that the conditions indicated by the investigations or records are representative of those existing in or throughout those areas, or any part thereof, or that unlooked-for developments may not occur, or that materials other than, or in proportions different from those indicated, may not be encountered.
- No information derived from the inspection of investigations or compilation thereof made by the Department or from the Engineer, or his assistants, will in any way relieve the bidder or contractor from any risk or from properly fulfilling the terms of the contract.

1-1.04 PROPOSAL FORMS

- The Department will furnish to each bidder a standard proposal form, which, when filled out and executed may be submitted as that bidder's bid. Bids not presented on forms so furnished, and copies or facsimiles of the bidder's completed and executed proposal forms submitted as a bid will be rejected.
- The proposal form is bound together with the contract in a book entitled "Proposal and Contract." The proposal shall set forth the bid price, in clearly legible figures, in the space provided, and shall be signed by the bidder, who shall fill out all blanks in the proposal form as therein required.

- The proposal shall be submitted as directed in the "Notice to Contractors" under sealed cover plainly marked as a proposal, and identifying the project to which the proposal relates and the date of the bid opening therefor. Proposals which are not properly marked may be disregarded.
- All proposal forms other than for "District Opening" projects shall be obtained from the Department of Transportation, Plans and Bid Documents, Room 0200, Transportation Building, 1120 N Street, California 95814, or as otherwise designated in the "Notice to Contractor."
- Proposals for "District Opening" projects shall be made on forms obtained from the District Director of Transportation in whose district the work is to be performed, but in all other respects the provisions in this Section 1-1.04 shall apply.

1-1.05 REQUIRED LISTING OF PROPOSED SUBCONTRACTORS

- Each proposal shall have listed therein the name and address of each subcontractor to whom the bidder proposes to subcontract portions of the work in an amount in excess of one-half of one percent of the total bid, in conformance with the Subletting and Subcontracting Fair Practices Act, commencing with Section 4100 of the Public Contract Code. The bidder's attention is invited to other provisions of the Act related to the imposition of penalties for a failure to observe its provisions by using unauthorized subcontractors or by making unauthorized substitutions.
- A sheet for listing the subcontractors, as required herein, is included in the "Proposal and Contract" book.

1-1.055 STATE EMPLOYEES AND DESIGN ENGINEERS MAY NOT BID ON CONSTRUCTION CONTRACTS

- No employee of the State shall be eligible to submit a proposal for, nor to subcontract for any portion of, nor to supply any materials for any contract administered by the Department.
- No engineering or architectural firm which has provided design services for a project shall be eligible to submit a proposal for the contract to construct the project nor to subcontract for any portion of the work. The ineligible firms include the prime contractor for design, subcontractors of portions of the design, and affiliates of either. An affiliate is a firm which is subject to the control of the same persons, through joint ownership or otherwise.

1-1.06 PREVIOUS DISQUALIFICATION, REMOVAL OR OTHER PREVENTION OF BIDDING

- Pursuant to Section 10162 of the Public Contract Code the bidder shall complete, under penalty of perjury, the questionnaire in the Proposal relating to previous disqualification, removal or other prevention of bidding of the bidder, or officers or employees of the bidder because of violation of law or a safety regulation.
- A bid may be rejected on the basis of a bidder, any officer of the bidder, or any employee of the bidder who has a proprietary interest in the bidder, having been disqualified, removed, or otherwise prevented from bidding on, or completing a Federal, State, or local project because of a violation of law or a safety regulation.

1-1.07 PROPOSAL GUARANTY

- All bids shall be presented under sealed cover and accompanied by one of the following forms of bidder's security:

  Cash, a cashier's check, a certified check, or a bidder's bond executed by an admitted surety insurer, made payable to the Director of Transportation.

- The security shall be in an amount equal to at least 10 percent of the amount bid. A bid will not be considered unless one of the forms of bidder's security is enclosed with it.
- The bidder's bond shall conform to the bond form in the book entitled "Proposal and Contract" for the project and shall be properly filled out and executed. The bidder's bond form included in that book may be used. Upon request, "Bidder's Bond" forms may be obtained from the Department of Transportation.

1-1.08 COMPLIANCE WITH ORDERS OF THE NATIONAL LABOR RELATIONS BOARD

- Pursuant to Public Contract Code Section 10232, the Contractor shall swear by a statement, under penalty of perjury, that no more than one final, unappealable finding of contempt of court by a Federal court has been issued against the Contractor within the immediately preceding 2-year period because of the Contractor's failure to comply with an order of a Federal court which orders the Contractor to comply with an order of the National Labor Relations Board. For purposes of Section 10232 a finding of contempt does not include any finding which has been vacated, dismissed, or otherwise removed by the court because the Contractor has complied with the order which was the basis for the finding. The State may rescind any contract in which the Contractor falsely swears to the truth of the statement required by Section 10232.
- The statement required by Public Contract Code Section 10232 is on the page preceding the signature page of the Proposal.

1-1.09 WITHDRAWAL OF PROPOSALS

- Any bid may be withdrawn at any time prior to the date and time fixed for the opening of bids only by written request for the withdrawal of the bid filed at the location at which the bid was received by the Department. The request shall be executed by the bidder or the bidder's duly authorized representative. The withdrawal of a bid does not prejudice the right of the bidder to file a new bid. Whether or not bids are opened exactly at the time fixed for opening bids, a bid will not be received after that time, nor may any bid be withdrawn after the time fixed for the opening of bids.

1-1.10 PUBLIC OPENING OF PROPOSALS

- Proposals will be opened and read publicly at the time and place indicated in the Notice to Contractors. Bidders or their authorized agents are invited to be present.

1-1.11 REJECTION OF PROPOSALS

- Proposals may be rejected if they have been transferred to another bidder, or if they show any alterations of form, additions not called for, conditional bids, incomplete bids, erasures, or irregularities of any kind.
- When proposals are signed by an agent, other than the officer or officers of a corporation authorized to sign contracts on its behalf or a member of a partnership, a "Power of Attorney" must be on file with the Department prior to opening bids or shall be submitted with the proposal; otherwise, the proposal may be rejected as irregular and unauthorized.

1-1.12 COMPETITIVE BIDDING

- If more than one proposal be offered by any individual, firm, copartnership, corporation, association, or any combination thereof, under the same or different names, all of those proposals may be rejected. A party who has quoted prices on materials or work to a bidder is not thereby disqualified from quoting prices to other bidders, or from submitting a bid directly for the materials or work.
- All bidders are put on notice that any collusive agreement to control or affect the awarding of this contract is in violation of the competitive bidding requirements of the State Contract Act and the Business and Professions Code and may render void any contract let under those circumstances.

1-1.13 RELIEF OF BIDDERS

- Attention is directed to the provisions of Public Contract Code Sections 5100 to 5107, inclusive, concerning relief of bidders and in particular to the requirement therein, that if the bidder claims a mistake was made in the bid presented, the bidder shall give the Department written notice within 5 days after the opening of the bids of the alleged mistake, specifying in the notice in detail how the mistake occurred.

1-1.14 INELIGIBILITY TO CONTRACT

- Public Contract Code Section 10285.1 provides as follows:

> Any State agency may suspend, for a period of up to three years from the date of conviction, any person from bidding upon, or being awarded, a public works or services contract with the agency under this part or from being a subcontractor at any tier upon the contract, if that person, or any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof, has been convicted by a court of competent jurisdiction of any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of any State or Federal antitrust law in connection with the bidding upon, award of, or performance of, any public works contract, as defined in Section 1101, with any public entity, as defined in Section 1100, including, for the purposes of this article, the Regents of the University of California or the Trustees of the California State University. A State agency may determine the eligibility of any person to enter into a contract under this article by requiring the person to submit a statement under penalty of perjury declaring that neither the person nor any subcontractor to be engaged by the person has been convicted of any of the offenses referred to in this section within the preceding three years.

- A form for the statement required by Section 10285.1 is included in the Proposal.

SECTION 2

AWARD AND EXECUTION OF CONTRACT

2-1.01 AWARD OF CONTRACT

The right is reserved to reject any and all proposals. The award of the contract, if it be awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed. The award, if made, will be made within 30 days after the opening of the proposals. This period will be subject to extension for any further period as may be agreed upon in writing between the Department and the bidder concerned.

2-1.02 RETURN OF PROPOSAL GUARANTIES

The proposal guaranties accompanying the proposals of the first, second and third lowest responsible bidders will be retained until the contract has been finally executed, after which all those proposal guaranties, except bidders' bonds and any guaranties which have been forfeited, will be returned to the respective bidders whose proposals they accompany. The proposal guaranties, other than bidder's bonds, submitted by all other unsuccessful bidders will be returned upon determination, by the Department, of the first, second and third lowest responsible bidders.

2-1.03 CONTRACT BONDS

The successful bidder shall furnish the 2 bonds required by the State Contract Act. One bond shall secure the payment of the claims of laborers, mechanics or materialmen employed on the work under the contract and the other bond shall guarantee the faithful performance of the contract. The bond forms will be furnished to the successful bidder by the Department.

Except as otherwise provided in Section 3248 of the Civil Code and Section 30154 of the Streets and Highways Code, the payment bond shall be in a sum equal to the contract price and the performance bond shall be in a sum equal to at least one-half of the contract price.

All alterations, extensions of time, extra and additional work, and other changes authorized by the General Conditions, the special provisions or any part of the contract may be made without securing the consent of the surety or sureties on the contract bonds.

2-1.04 EXECUTION OF CONTRACT

The contract shall be signed by the successful bidder and returned, together with the contract bonds, within 8 days, not including Saturdays, Sundays and legal holidays, after the bidder has received the contract for execution.

2-1.05 FAILURE TO EXECUTE CONTRACT

Failure of the lowest responsible bidder, the second lowest responsible bidder, or the third lowest responsible bidder to execute the contract and file acceptable bonds as provided herein within 8 days, not including Saturdays, Sundays and legal holidays, after that bidder has received the contract for execution shall be just cause for the forfeiture of the bidder's security. The successful bidder may file with the Department a written notice, signed by the bidder or the bidder's authorized representative, specifying that the bidder will refuse to execute the contract if it is presented. The filing of this notice shall have the same force and effect as the failure of the bidder to execute the contract and furnish acceptable bonds within the time hereinbefore prescribed.

GENERAL CONDITIONS

SECTION 1

DEFINITIONS AND TERMS

1-1.01 GENERAL

- Unless the context otherwise requires, wherever in the specifications and other contract documents the following abbreviations and terms, or pronouns in place of them, appear in the contract documents, the intent and meaning shall be interpreted as provided in this Section 1.
- Working titles having a masculine gender, such as "workman" and "journeyman" and pronouns, such as "he" and "himself", are utilized in these General Conditions, the Instructions to Bidders and the special provisions for the sake of brevity, and are intended to refer to persons of either gender.

1-1.02 ACCEPTANCE

- The formal written acceptance by the Director of Transportation of an entire contract which has been completed in all respects in conformance with the contract documents and any modifications thereof previously approved.

1-1.03 ADDENDUM

- A document or written communication issued by the Department during the bidding period which modifies, supersedes, or supplements the original contract documents.

1-1.04 BIDDER

- Any individual, firm, partnership, corporation, or combination thereof, submitting a proposal for the work contemplated, acting directly, or through a duly authorized representative.

1-1.05 CONTRACT

- The written agreement covering the performance of the work and the furnishing of labor, materials, tools and equipment in the construction of the work. The contract shall include the notice to contractors, Instructions to Bidders, proposal, plans, General Conditions, special provisions and contract bonds; also any and all supplemental agreements amending or extending the work contemplated and which may be required to complete the work in a substantial and acceptable manner. Supplementary agreements are written agreements covering alterations, amendments, or extensions to the contract and include contract change orders.

1-1.06 CONTRACTOR

- The person or persons, firm, partnership, corporation, or combination thereof, private or municipal, who have entered into a contract with the Department of Transportation, as party or parties of the second part or their legal representatives.

1-1.07 DAYS

- Unless otherwise designated, days as used in the contract documents will be understood to mean calendar days.

1-1.08 DEPARTMENT

- The Department of Transportation of the State of California, as created by law.

1-1.09 DIRECTOR

- The executive officer of the Department of Transportation, as created by law.

1-1.10 ENGINEER

- The Chief Engineer, Department of Transportation, acting either directly or through properly authorized agents, the agents acting within the scope of the particular duties delegated to them.

1-1.11 GENERAL NOTES

- The written instructions, provisions, conditions or other requirements appearing on the plans, and so identified thereon, which pertain to the performance of the work.

1-1.12 LABORATORY

- The Division of Engineering Services - Materials Engineering and Testing Services and the Division of Engineering Services - Geotechnical Services of the Department of Transportation, or established laboratories of the various Districts of the Department, or other laboratories authorized by the Department to test materials and work involved in the contract. When a reference is made in the specifications to the "Transportation Laboratory," the reference shall mean the Division of Engineering Services - Materials Engineering and Testing Services and the Division of Engineering Services - Geotechnical Services, located at 5900 Folsom Boulevard, Sacramento, CA 95819, Telephone (916) 227-7000.

1-1.13 LEGAL HOLIDAYS

- Those days designated as State holidays in the Government Code.

1-1.14 LIQUIDATED DAMAGES

- The amount prescribed in the special provisions, pursuant to the authority of Public Contract Code Section 10226, to be paid to the State or to be deducted from any payments due or to become due the Contractor for each day's delay in completing the whole or any specified portion of the work beyond the time allowed in the special provisions.

1-1.15 PLANS

- The official drawings including plans, elevations, sections, detail drawings, diagrams, plates, general notes, information and schedules thereon, or exact reproductions thereof, approved by the Engineer, which show the location, character, dimensions and details of the work to be performed. The plans include any drawings or plates bound within the special provisions.

1-1.16 PREMISES

- The area of State-owned property which surrounds the work site, limited by the property lines thereof. In some cases the premises may coincide with the work site.

1-1.17 PROPOSAL

- The offer of the bidder for the work when made out and submitted on the prescribed proposal form, properly signed and guaranteed.

1-1.18 PROPOSAL FORM

- The approved form upon which the Department of Transportation requires formal bids be prepared and submitted for the work.

1-1.19 PROPOSAL GUARANTY

- The cash, cashier's check, certified check, or bidder's bond accompanying the proposal submitted by the bidder, as a guaranty that the bidder will enter into a contract with the Department of Transportation for the performance of the work if the contract is awarded to the bidder.

1-1.20 SPECIAL PROVISIONS

- The special provisions are specific clauses setting forth conditions or requirements of the work and supplementary to these General Conditions and the Instructions to Bidders. The Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates is to be considered as a part of the special provisions.

1-1.21 STATE

- The State of California.

1-1.22 STATE CONTRACT ACT

- An act to regulate contracts for the erection, construction, alteration, repair or improvement of any state structure, building, road, or other State improvements of any kind, to be found in Chapter 1, Division 2 of the Public Contract Code.

1-1.23 WORK

- The furnishing of all labor, and the furnishing and installing of all materials, articles, supplies and equipment as specified, designated, or required by the contract.

1-1.24 WORKING DAY

- Every day except Saturdays, Sundays, legal holidays, and those days not charged as working days pursuant to Section 6-1.07, "Time of Completion," of these General Conditions.

1-1.25 WORK SITE

- The area of actual construction and the areas immediately adjacent thereto.

1-1.26 ABBREVIATIONS

AAMA	Architectural Aluminum Manufacturers' Association
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Movement and Control Association
ANSI	American National Standards Institute
APA	American Plywood Association
APHA	American Public Health Association
API	American Petroleum Institute.
AREA	American Railway Engineering Association
ARI	American Refrigeration Institute
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American Wire Gage
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
CBC	California Building Code
CEC	California Electrical Code
CS	Commercial Standards (US Department of Commerce)
EIA	Electronic Industries Association
ESO	Electrical Safety Orders
FGMA	Flat Glass Marketing Association
FM	Factory Mutual
FS	Federal Specification
IEEE	Institute of Electrical and Electronics Engineers
ICBO	International Conference of Building Officials
NAAMM	National Association of Architectural Metal Manufacturers
NBFU	National Board Fire Underwriters
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NFPA	National Fire Protection Association
PEI	Porcelain Enamel Institute
PS	Product Standard (US Department of Commerce)
RIS	Redwood Inspection Service
SCPI	Structural Clay Products Institute
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
TCA	Tile Council of America
TPI	Truss Plate Institute
UBC	Uniform Building Code
UL	Underwriters' Laboratory
UPC	Uniform Plumbing Code
WCLB	Grade Stamp for WCLIB
WCLIB	West Coast Lumber Inspection Bureau (Grade Stamped WCLB)
WIC	Woodwork Institute of California
WWPA	Western Wood Products' Association

Units of Measurement

- Some of the symbols for units of measurement used in the specifications are defined as follows. The symbols for other units of measurement used in the specifications are as defined in ASTM Designation: E-380, or in the various specifications and test referenced in the specifications.

Symbols as used in the Specifications	Definitions
A	amperes
g	gram
kg	kilogram
ha	hectare (10 000 m^2)
h	hour
J	joule
L	liter
m	meter
km	kilometer
mm	millimeter
µm	micrometer
nm	nanometer
m^2	square meter
m^3	cubic meter
N	newton
N·m	newton meter
Ω	ohm
Pa	pascal
kPa	kilopascal
MPa	megapascal
s	second
tonne	metric ton (1000 kg)
W	watt
V	volt

SECTION 2

CONTROL AND SCOPE OF THE WORK

2-1.01 AUTHORITY OF ENGINEER

- The Engineer shall decide all questions which may arise as to the quality or acceptability of materials furnished and work performed and as to the manner of performance and rate of progress of the work; all questions which may arise as to the interpretation of the plans and special provisions; all questions as to the acceptable fulfillment of the contract on the part of the Contractor; and all questions as to compensation. The Engineer's decision shall be final, and the Engineer shall have authority to enforce and make effective those decisions and orders which the Contractor fails to carry out promptly.

2-1.02 INTENT OF PLANS AND SPECIAL PROVISIONS

- The intent of the plans and special provisions is to prescribe the details for the construction and completion of the work which the Contractor undertakes to perform in conformance with the terms of the contract. Where the plans or special provisions describe portions of the work in general terms, but not in complete detail, it is understood that only the best general practice is to prevail and that only materials and workmanship of the first quality are to be used. Unless otherwise specified, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals, and do all the work involved in executing the contract in a satisfactory and workmanlike manner.

2-1.03 COORDINATION AND INTERPRETATION OF CONTRACT DOCUMENTS

- These General Conditions, the plans, special provisions, contract change orders, and all supplementary documents are essential parts of the contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary, and to describe and provide for a complete work.
- Plans shall govern over these General Conditions; the special provisions shall govern over both these General Conditions and the plans.
- Should it appear that the work to be done or any of the matters relative thereto are not sufficiently detailed or explained in these General Conditions, the special provisions, or the plans, the Contractor shall apply to the Engineer for further explanations as may be necessary and shall conform to them as part of the contract. In the event of any doubt or question arising respecting the true meaning of these General Conditions, the special provisions or the plans, reference shall be made to the Engineer, whose decision thereon shall be final.
- In the event of any discrepancy, between any drawing and the figures written thereon, the figures shall be taken as correct. Detail drawings shall prevail over general drawings and general notes shall prevail over drawings.

2-1.04 SHOP DRAWINGS, DESCRIPTIVE DATA, SAMPLES, AND ALTERNATIVES

- It shall be the Contractor's responsibility to submit, so as to cause no delay in the work, all shop drawings, descriptive data, samples for the various trades as required by the special provisions, and offers of alternatives, if any. The submittals shall be checked and coordinated by the Contractor with the work of other trades involved before they are submitted to the Engineer for examination.
- Submittals shall be delivered to the locations indicated in the special provisions.
- Work requiring the submittal of shop drawings, descriptive data or samples shall not begin prior to approval of that submittal by the Engineer. Fifteen working days shall be allowed for approval or return for correction of each submittal or resubmittal. Approval of submittals shall not operate to waive any of the requirements of the plans and specifications or relieve the Contractor of any obligation thereunder, and defective work, materials and equipment may be rejected notwithstanding the approval of that submittal. Should the Engineer fail to complete his review within the time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in review, an extension of time commensurate with the delay in completion of the work thus caused will be granted pursuant to the provisions in Section 6-1.08, "Liquidated Damages," of these General Conditions, and no additional compensation will be allowed for the delay.
- Submittals shall be made by a letter of transmittal which shall contain a list of all matter submitted and identification of all variations from the plans and special provisions contained in the submittal. The letter and all items accompanying the same shall be fully identified as to project name and location, Contractor's name, district, county, and contract number, with ample cross references to the contract documents, to facilitate identification of items and their location in the work. Additional specific requirements shall be as follows:

Shop Drawings

- The Contractor shall submit at least 5 copies of all shop drawings required by the special provisions. Two copies will be returned to the Contractor either approved for use or returned for correction and resubmittal. Shop drawings include any drawing which requires execution by a draftsman as distinguished from printed matter. The size of shop drawings shall be 559 mm x 864 mm or 279 mm x 432 mm in size.

Descriptive Data

- The Contractor shall submit 5 copies of each set of manufacturer's brochures or other data required by the special provisions. The State will examine the submittals and return 2 copies either approved for use or returned for correction and resubmittal.

Samples

- The Contractor shall submit samples of articles, materials or equipment as required by the special provisions. The work shall be in conformance with the approved samples. Samples shall be removed from State property when directed or may be incorporated in the work if approved by the Engineer. Samples not removed by the Contractor will become the property of the State or, at the State's option, will be removed or disposed of by the State at the Contractor's expense.

Alternatives

- For convenience in designation on the plans or in the special provisions, certain materials, articles, or equipment may be designated by a brand or a trade name or the name of the manufacturer together with catalog designation or other identifying information, hereinafter referred to generically as "designated by brand name". An alternative material, article, or equipment which is of equal quality and of the required characteristics for the purpose intended may be proposed for use provided the Contractor complies with the following requirements:

1 The Contractor shall submit his proposal for an alternative in writing. The request shall be made in ample time to permit approval without delaying the work, but need not be made in less than 35 days after award of the contract.

2 No proposal will be considered unless accompanied by complete information and descriptive data, necessary to determine the equality of the offered materials, articles, or equipment. Samples shall be provided when requested by the Engineer. The Contractor shall satisfy the Engineer as to the comparative quality, suitability, or performance of the offered materials, articles, or equipment. In the event that the Engineer rejects the use of the alternative materials, articles, or equipment, then one of the particular products designated by brand name shall be furnished.

- Approval of submittals by the Engineer shall not relieve the Contractor from responsibility for the successful completion of the work, nor shall it relieve the Contractor from responsibility for errors in the submittals. A failure by the Contractor to identify in the letter of transmittal, material deviations from the plans or specifications shall void the submittal and any action taken thereon by the Engineer. When specifically requested by the Engineer, the Contractor shall resubmit the shop drawings, descriptive data and samples as may be required.
- If any mechanical, electrical, structural, or other changes are required for the proper installation and fit of alternative materials, articles, or equipment, or because of deviations from the contract plans and special provisions, the changes shall not be made without the approval of the Engineer and shall be made without additional cost to the State.

2-1.045 DIFFERING SITE CONDITIONS

- During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the contract or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract, are encountered at the site, the party discovering those conditions shall promptly notify the other party in writing of the specific differing conditions before they are disturbed and before the affected work is performed.
- Upon written notification, the Engineer will investigate the conditions, and if the Engineer determines that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the contract, an adjustment, excluding loss of anticipated profits, will be made and the contract modified in writing accordingly. The Engineer will notify the Contractor of his determination whether or not an adjustment of the contract is warranted.
- No contract adjustment which results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice.
- No contract adjustment will be allowed under the provisions specified in this section for any effects caused on unchanged work.

- Any contract adjustment warranted due to differing site conditions will be made in conformance with the provisions in Section 3-1.01, "Changes," of these General Conditions, except as otherwise provided.

2-1.05 PRESERVATION AND CLEANING

- The Contractor shall clean up the work at frequent intervals and at other times when directed by the Engineer. While finish work is being accomplished, floors shall be kept clean, free of dust, construction debris and trash. Upon completion of the work, the Contractor shall remove from the premises the Contractor's construction equipment and any waste materials not previously disposed of, leaving the premises thoroughly clean and ready for final inspection.

2-1.06 LIMITATIONS ON WORK SITE AND PREMISES

- The Contractor shall limit the Contractor's construction operations to the work site unless otherwise shown on the plans or specified. The Contractor shall perform no operations of any nature over or on the premises except those operations as are authorized by the plans or special provisions, or as authorized by the Engineer.

2-1.07 SUPERINTENDENCE

- The Contractor shall designate in writing before starting work, an authorized representative who shall have the authority to represent and act for the Contractor.
- When the Contractor is comprised of 2 or more persons, firms, partnerships, or corporations functioning on a joint venture basis, the Contractor shall designate in writing before starting work, the name of one authorized representative who shall have the authority to represent and act for the Contractor.
- The authorized representative shall be present at the site of the work at all times while work is actually in progress on the contract. When work is not in progress and during periods when work is suspended, arrangements acceptable to the Engineer shall be made for any emergency work which may be required.
- Whenever the Contractor or the Contractor's authorized representative is not present on any particular part of the work where it may be desired to give direction, orders will be given by the Engineer, which shall be received and obeyed by the superintendent or foreman who may have charge of the particular work in reference to which the orders are given.
- Any order given by the Engineer, not otherwise required by the specifications to be in writing, will on request of the Contractor, be given or confirmed by the Engineer in writing.

2-1.08 CHARACTER OF WORKMEN

- If any subcontractor or person employed by the Contractor shall appear to the Engineer to be incompetent or to act in a disorderly or improper manner, they shall be discharged immediately on the request of the Engineer, and that person shall not again be employed on the work.

2-1.09 INSPECTION

- The Contractor shall at all times permit the Engineer and the Engineer's authorized agents to inspect the work or any part thereof. The Contractor shall maintain proper facilities and provide safe access for inspection by the Engineer to all parts of the work, and to the shops where the work is in preparation. Work shall not be covered up until authorized by the Engineer and the Contractor shall be solely responsible for notifying the Engineer where and when the work is in readiness for inspection and testing. Should any work be covered without authorization, it shall, if so ordered, be uncovered at the Contractor's expense.
- Whenever the Contractor intends to perform work on Saturday, Sunday, or a legal holiday, the Contractor shall give notice to the Engineer of the Contractor's intention 48 hours prior to performing that work, or a longer period as may be specified so that the Engineer may make necessary arrangements.

2-1.10 REMOVAL OF REJECTED AND UNAUTHORIZED WORK

- All work which has been rejected shall be remedied, or removed and replaced by the Contractor in a manner acceptable to the Engineer and no compensation will be allowed to the Contractor for the removal, replacement, or remedial work.
- Any work done beyond the lines shown on the plans or established by the Engineer, or any work done without written authority will be considered as unauthorized work and will not be paid for. Upon order of the Engineer, unauthorized work shall be remedied, removed, or replaced at the Contractor's expense.
- Upon failure of the Contractor to comply promptly with any order of the Engineer made under this Section 2-1.10, the Department may cause rejected or unauthorized work to be remedied, removed, or replaced, and the costs thereof will be deducted from any moneys due or to become due the Contractor.

2-1.11 COST REDUCTION INCENTIVE

- The Contractor may submit to the Engineer, in writing, proposals for modifying the plans, special provisions or other requirements of the contract for the sole purpose of reducing the total cost of construction. The cost reduction proposal shall not impair, in any manner, the essential functions or characteristics of the project, including but not limited to service life, economy of operation, ease of maintenance, desired appearance, or design and safety standards.
- Prior to preparing a cost reduction proposal, the Contractor shall request a meeting with the Engineer to discuss the proposal in concept and to determine the merit of the cost reduction proposal. Items of discussion will also include permit issues, impact on other projects, impact on the project schedule, peer reviews, and review times required by the Department and other agencies.
- Cost reduction proposals shall contain the following information:

1. A description of both the existing contract requirements for performing the work and the proposed changes.
2. An itemization of the contract requirements that must be changed if the proposal is adopted.
3. A detailed estimate of the cost of performing the work under the existing contract and under the proposed change. The estimates of cost shall be determined in the same manner as if the work were to be paid for as a change in the work as provided in Section 3, "Changes in the Work," of these General Conditions.
4. A statement of the time within which the Engineer must make a decision thereon.
5. The contract work affected by the proposed changes, including any quantity variation attributable thereto.

- The provisions of this Section 2-1.11 shall not be construed to require the Engineer to consider any cost reduction proposal which may be submitted hereunder; proposed changes in basic design will not be considered as an acceptable cost reduction proposal; and the Department will not be liable to the Contractor for failure to accept or act upon any cost reduction proposal submitted pursuant to this section nor for any delays to the work attributable to any cost reduction proposal. If a cost reduction proposal is similar to a change in the plans or special provisions, under consideration by the Department for the project, at the time the proposal is submitted or if the proposal is based upon or similar to standard special provisions adopted by the Department after the advertisement for the contract, the Engineer will not accept the proposal, and the Department reserves the right to make the changes without compensation to the Contractor under the provisions of this section.
- The Contractor shall continue to perform the work in conformance with the requirements of the contract until an executed change order, incorporating the cost reduction proposal has been issued. If an executed change order has not been issued by the date upon which the Contractor's cost reduction proposal specifies that a decision thereon should be made, or such other date as the Contractor may subsequently have specified in writing, the cost reduction proposal shall be deemed rejected.
- The Engineer shall be the sole judge of the acceptability of a cost reduction proposal and of the estimated net savings in construction costs from the adoption of all or any part of the proposal. In determining the estimated net savings, the right is reserved to disregard the schedules of values if, in the judgment of the Engineer, the schedule does not represent a fair measure of the value of work to be performed or to be deleted.
- The Department reserves the right where it deems action is appropriate, to require the Contractor to share in the Department's costs of investigating a cost reduction proposal submitted by the Contractor as a condition of considering the proposal. Where this condition is imposed, the Contractor shall indicate acceptance thereof in writing, and that acceptance shall constitute full authority for the Department to deduct amounts payable to the Department from any moneys due or that may become due to the Contractor under the contract.
- If the Contractor's cost reduction proposal is accepted in whole or in part the acceptance will be by a contract change order, which shall specifically state that it is executed pursuant to this Section 2-1.11. The change order shall incorporate the changes in the plans and special provisions which are necessary to permit the cost reduction proposal or that part of it as has been accepted to be put into effect, and shall include any conditions upon which the Department's approval thereof is based if the approval of the Department is conditional. The change order shall also set forth the estimated net savings in construction costs attributable to the cost reduction proposal effectuated by the change order, and shall further provide that the Contractor be paid 50 percent of that estimated net savings amount. The Contractor's cost of preparing the cost reduction incentive proposal and the Department's costs of investigating a cost reduction incentive proposal, including any portion thereof paid by the Contractor, shall be excluded from consideration in determining the estimated net savings in construction costs.
- Acceptance of the cost reduction proposal and performance of the work thereunder shall not extend the time of completion of the contract unless specifically provided for in the contract change order authorizing the use of the cost reduction proposal.

- The amount specified to be paid to the Contractor in the change order which effectuates a cost reduction proposal shall constitute full compensation to the Contractor for the cost reduction proposal and the performance of the work thereof pursuant to the change order.
- The Department expressly reserves the right to adopt a cost reduction proposal for general use on contracts administered by the Department when it determines that the proposal is suitable for application to other contracts. When an accepted cost reduction proposal is adopted for general use, only the Contractor who first submitted that proposal will be eligible for compensation pursuant to this section, and in that case, only as to those contracts awarded to that Contractor prior to submission of the accepted cost reduction proposal and as to which the cost reduction proposal is also submitted and accepted. Cost reduction proposals identical or similar to previously submitted proposals will be eligible for consideration and compensation under the provisions of this Section 2-1.11 if the identical or similar previously submitted proposals were not adopted for general application to other contracts administered by the Department. Subject to the provisions contained herein, the State or any other public agency shall have the right to use all or any part of any submitted cost reduction proposal without obligation or compensation of any kind to the Contractor.
- This Section 2-1.11 shall apply only to contracts awarded to the lowest bidder pursuant to competitive bidding.

SECTION 3

CHANGES IN THE WORK

3-1.01 CHANGES

- The Department reserves the right to order changes in the contract at any time prior to the acceptance of the work by the Director, and the Contractor shall comply with the ordered changes. Changes or deviations from the contract shall not be made without authority in writing from the Engineer, and changes to the work without the Engineer's written approval will be considered unauthorized work and will not be paid for.
- On the basis set forth in this Section 3, the contract lump sum price will be adjusted for any ordered change which results in a change in the cost of the work.
- When ordered by the Engineer, the Contractor shall halt work in the area affected by a proposed change. Whenever it appears to the Contractor that a change is necessary, the Contractor shall immediately notify the Engineer of the reasons for that change; however, work in the area affected shall not be discontinued unless ordered by the Engineer.
- For any approved change in the work, the Contractor shall be entitled to an adjustment in time equal to the number of working days which completion of the entire work is delayed due to the changed work, and the State will be entitled to an adjustment in time equal to the number of working days which completion of the entire work is advanced due to the changed work. For ordinary changes, the Contractor's cost estimate for the changed work shall state the amount of extra time, if any, that the Contractor considers should be allowed for making the requested change. Failure to request additional time when submitting the estimate, or failure to submit the estimate, shall constitute a waiver of the right to later claim any adjustment in time based upon changed work. For ordinary changes which decrease the amount of work and for indeterminate type changes, an adjustment in time commensurate with the changed work will be determined by the Engineer. Disagreement as to time adjustments shall not affect contract price adjustments, nor shall it be cause for not proceeding with the changed work when ordered by the Engineer. The Contractor shall have the right, however, to further pursue a time adjustment in the event agreement is not reached.

3-1.01A Ordinary Changes

- The Engineer will notify the Contractor in writing of any proposed changes and describe the intended change. Within 15 days after receipt of a written request, the Contractor shall submit his proposed price to be added or deducted from the contract price due to the change. The Contractor's proposed price to be added to or deducted from the contract price shall be supported by detailed estimates of cost prepared by the Contractor. The Contractor shall also provide information to support any request for an adjustment in contract time which is directly attributable to the changed work. The Contractor shall, upon request by the Engineer, permit inspection of his original contract estimate, subcontract agreements or purchase orders relating to the change.
- If agreement is reached on the adjustment in compensation as provided in Section 3-1.01C, "Agreed Cost for Changes," of these General Conditions, the Contractor shall proceed with the work at the agreed price.
- If the Contractor and the Engineer fail to agree as to the adjustment in compensation for the performance of the changed work, the Contractor, upon written order from the Engineer, shall proceed immediately with the changed work and the contract price will be adjusted in conformance with the provisions in Section 3-1.01D, "Failure to Agree to the Cost of Changes," of these General Conditions.
- If the Contractor fails to submit his cost estimate within the specified 15 day period, the specified period may be extended in writing by the Engineer. If the Engineer does not so extend the specified period, or if the Contractor fails to submit his cost estimate within the extended time period, the Contractor shall commence the work immediately upon receipt of written order from the Engineer and the contract price will be adjusted in conformance with the provisions in Section 3-1.01D, "Failure to Agree to the Cost of Changes," of these General Conditions.

3-1.01B Indeterminate Type Changes

- Changes in the work of a kind where the cost of the work cannot be determined until completed, may be authorized by the Engineer in writing. The written order shall state that it is issued pursuant to this Section 3-1.01B. Upon receipt of a written order from the Engineer, the Contractor shall proceed with the ordered work and the contract price will be adjusted in conformance with the provisions in Section 3-1.01D, "Failure to Agree to the Cost of Changes," of these General Conditions.

3-1.01C Agreed Cost For Changes

- If the Engineer and the Contractor agree as to the adjustment in compensation for the performance of changed work on the basis of the Contractor's proposed cost estimate of the work, the contract lump sum price will be adjusted accordingly. The adjustment in compensation shall be agreed to in writing and executed by both parties.

3-1.01D Failure To Agree To The Cost Of Changes

- When a proposed change order decreases the cost of the work and the Engineer and the Contractor fail to agree upon the decreased cost thereof, the Engineer's estimated decrease in cost will be deducted from the contract price. The Contractor will be allowed 15 days after receipt of a contract change order approved by the Engineer, in which to file a written protest setting forth in what respects the Contractor differs from the Engineer's estimate of decreased cost, otherwise the decision of the Engineer to deduct the Engineer's estimate of decreased cost shall be deemed to have been accepted by the Contractor as correct.
- In the event the Engineer and the Contractor fail to agree on the cost of a change order which increases the cost of the work, the Engineer will maintain a daily job record containing a detailed summary of all labor, materials and equipment required by the ordered change. At the end of each day's work, the Contractor shall review the Engineer's daily job record comparing with the Contractor's own records, and after agreement is reached, the daily job record shall be signed by both the Engineer and the Contractor and shall become the basis for payment for the changed work. Upon completion of the work under the change order, the Contractor shall submit an invoice listing only those items of labor, materials and equipment that were agreed to by both the Engineer and the Contractor to be in addition to the requirements of the contract, together with allowable markups.
- When there is a failure to agree as to cost, no payment for the changed work will be made to the Contractor until all work called for in the change order has been completed, except that progress payments may be made on those portions of the changed work which the Contractor and the Engineer agree as to cost.

3-1.01E Allowable Costs For Changes

- The only costs which will be allowed because of changed work and the manner in which these costs shall be computed are set forth in Sections 3-1.01E(1) through 3-1.01E(5) of these General Conditions. Where the term "actual cost" is used in the aforesaid sections, it shall be deemed to mean "estimated cost" where the adjustment in compensation is of a necessity based upon estimated costs.

3-1.01E(1) Labor

- The Contractor will be paid an amount based on the actual cost for labor and supervision directly required for the performance of the changed work, including payments, assessment of benefits required by lawful labor union collective bargaining agreements; compensation insurance payments; contributions made to the State pursuant to the Unemployment Insurance Code, and for taxes paid to the Federal Government pursuant to the Social Security Act of August 14, 1935, as amended. No labor cost will be recognized at a rate in excess of the wages prevailing in the locality at the time the work is performed, nor will the use of a labor classification which would increase the cost be permitted unless the Contractor establishes to the complete satisfaction of the Engineer the necessity for payment at a higher rate.

3-1.01E(2) Materials

- The Contractor will be paid an amount based on the actual cost of the materials directly required for the performance of the changed work. The cost of materials may include the costs of procurement, transportation and delivery if necessarily incurred. If a cash or trade discount by the actual supplier is available to the Contractor, it shall be credited to the State. If the materials are obtained from a supply or source owned wholly or in part by the Contractor, payment therefor will not exceed the current wholesale price for the materials. If, in the opinion of the Engineer, the cost of materials is excessive, or if the Contractor fails to furnish satisfactory evidence of the cost to the Engineer from the actual supplier, the cost of the materials shall be deemed to be the lowest current wholesale price at which similar materials are available in the quantities required. The Department reserves the right to furnish the materials required by the change order as it deems advisable, and the Contractor shall have no claim for cost or markups on material furnished by the Department.

3-1.01E(3) Equipment

- The Contractor will be paid an amount based on the actual cost for the use of equipment directly required and approved by the Engineer in the performance of the changed work. No payment will be made for time while equipment is inoperative due to breakdowns or on days when no work is performed. In addition, the rental time shall include the time required to move the equipment to the work from the nearest available source of the required equipment, and to return it to the source. If the equipment is not moved by its own power, then loading and transportation costs will be paid. Moving time, loading and transportation costs will only be paid if the equipment is used exclusively on the changed work during the time between move in and move out. Individual pieces of equipment having a replacement value of $500 or less shall be considered to be tools or small equipment, and no payment will be made therefor. For equipment owned, furnished, or rented by the Contractor, no cost therefor shall be recognized in excess of the rental rates established by distributors or equipment rental agencies in the locality where the work is performed.

3-1.01E(4) Markups

- When a change order increases the cost of the work, the Contractor may add the following maximum markups to the actual costs of labor, materials, or equipment rental:

  33 percent for labor;
  15 percent for materials; and
  15 percent for equipment rental.

- The above markups include full compensation for bonds, profit and overhead.
- When a change order decreases the cost of the work, the reduction in cost shall include a 5 percent markup on the estimated cost for furnishing the labor, materials and equipment which would have been used on the work had the change order not been issued.
- When a change order involves both added work and deleted work, the markup or markups to be used shall be as follows:

  The actual costs of labor, materials, and equipment rental for added and deleted work shall be calculated separately without adding markups. If the difference between the calculated costs for labor results in an increased cost, a markup of 33 percent shall be applied to the increased cost. If the difference between the calculated costs of materials or equipment rental results in an increased cost, a markup of 15 percent shall be applied to the increased costs of materials or equipment rental, as the case may be. If the difference between the calculated costs for labor, materials or equipment rental results in a decreased cost, a markup of 5 percent shall be applied to the decreased costs of labor, materials or equipment rental, as the case may be.

- When added or deleted work is performed by an authorized subcontractor, approved in conformance with the provisions in Section 1-1.05, "Required Listing of Proposed Subcontractors," of the Instructions to Bidders, an additional 5 percent will be added to the total cost of the work including all markups specified in this Section 3-1.01E(4). The additional 5 percent markup shall reimburse the Contractor for additional administrative costs, and no other additional payment will be made by reason of performance of the work by a subcontractor.

3-1.01E(5) General Limitation

- In no event shall any actual cost for added work be recognized in excess of market values prevailing at the time of the change, unless the Contractor can establish to the satisfaction of the Engineer that the Contractor investigated all possible means of obtaining the added work at prevailing market values and that the excess cost could not be avoided by the Contractor. The Engineer will determine the necessity for incurring the costs enumerated above, and as to whether they are directly required for the performance of the changed work. Lump sum quotations may be accepted at the option of the Engineer. When a change order deletes work from the contract, the computation of the cost thereof shall be the values which prevailed at the time bids for the work were opened.

- When work under this Section 3 is performed by forces other than the Contractor's organization, no additional payment will be made by the State by reason of the performance of the work by a subcontractor or other forces, except as provided elsewhere in this Section 3.

SECTION 4

CONTROL OF MATERIALS

4-1.01 MATERIALS

- The Contractor shall furnish all materials required to complete the work, except materials that are designated in the special provisions to be furnished by the State and materials furnished by the State in conformance with Section 3, "Changes in the Work," of these General Conditions.
- Unless otherwise specified in the special provisions, materials furnished by the Contractor for incorporation into the work shall be new. When the quality or kind of materials, articles, or equipment is not specifically indicated, then the quality or kind thereof shall be similar to those which are indicated.
- Articles or materials to be incorporated in the work shall be stored in such a manner as to insure the preservation of their quality and fitness for the work, and to facilitate inspection.
- All materials which do not conform to the requirements of the plans and special provisions, as determined by the Engineer, will be rejected whether in place or not. Rejected material shall be removed immediately from the site of the work, unless otherwise permitted by the Engineer. No rejected material, the defects of which have been subsequently corrected, shall be used in the work, unless approval in writing has been given by the Engineer. Upon failure of the Contractor to comply promptly with any order of the Engineer made under these provisions, the Engineer shall have authority to cause the removal and replacement of rejected material and to deduct the cost thereof from any moneys due or to become due the Contractor.
- Manufacturers' warranties, guaranties, instruction sheets and parts lists, which are furnished with certain materials incorporated in the work, shall be delivered to the Engineer before acceptance of the contract.
- Unless otherwise designated in the special provisions, materials furnished by the State will be delivered to the job site. Materials furnished by the State that are designated in the special provisions as available at locations other than the job site shall be hauled to the site of the work by the Contractor at his expense, including any necessary loading and unloading that may be involved.
- The Contractor will be held responsible for all materials furnished to him, and he shall pay all demurrage and storage charges. State-furnished materials lost or damaged from any cause whatsoever shall be replaced by the Contractor. The Contractor will be liable to the Department for the cost of replacing State-furnished material and those costs may be deducted from any moneys due or to become due the Contractor.

4-1.02 PRODUCT AND REFERENCE STANDARDS

- When descriptive catalog designations, including manufacturer's name, product brand name, or model number are referred to in the contract documents, those designations shall be considered as being those found in industry publications in effect on the day the Notice to Contractors for the work is dated.
- When standards or test designations are referred to in the contract documents by specific date of issue, they shall be considered a part of the contract. When those references do not bear a date of issue, the edition in effect on the day the Notice to Contractors for the work is dated shall be considered as part of the contract.

4-1.03 SAMPLING AND TESTING OF MATERIALS

- Unless otherwise specified, all tests shall be performed in conformance with the methods used by the Department of Transportation and shall be made by the Engineer or his designated representative.
- The Department has developed methods for testing the quality of materials and work. These methods are identified by number and are referred to as California Test. Up to five copies of individual California Tests are available at the Division of New Technology, Materials and Research, located at 5900 Folsom Boulevard, (P.O. Box 19128), Sacramento, CA 95819, and will be furnished to interested persons upon request. If a complete set of California Test Methods is desired, it can be purchased from the Department's Office of Business Management, Materiel Operations Branch, 1900 Royal Oaks Drive, Sacramento, CA 95815.
- Whenever a reference is made in the special provisions to a California Test by number, it shall mean the California Test in effect on the day the Notice to Contractors for the work is dated.
- Whenever the special provisions provide an option between 2 or more tests, the Engineer will determine the test method to be used.

- Whenever a specification, manual, or test designation provides for test reports (such as certified mill test reports) from the manufacturer, copies of those reports, identified as to the lot of material, shall be furnished to the Engineer. The manufacturer's test reports shall supplement the inspection, sampling and testing provisions of this Section 4-1.03 and shall not constitute a waiver of the State's right to inspect. When material which cannot be identified with specific test reports is proposed for use, the Engineer may, at his discretion, select random samples from the lot for testing. Testing specimens from the random samples, including those required for retest, shall be prepared in conformance with the referenced specification and furnished by the Contractor at his expense. The number of samples and test specimens shall be entirely at the discretion of the Engineer.
- When requested by the Engineer, the Contractor shall furnish, without charge, samples of all materials entering into the work, and no material shall be used prior to approval by the Engineer, except as provided in Section 4-1.04, "Certificates of Compliance," of these General Conditions.

4-1.035 TESTING BY CONTRACTOR

- The Contractor shall be responsible for controlling the quality of the material entering the work and of the work performed, and shall perform testing as necessary to ensure quality control. The test methods used for quality control testing by the Contractor shall be as determined by the Contractor. The results of those quality control tests shall be made available to the Engineer upon request. Contractor performed quality control tests are for the Contractor's use in controlling the work and will not be accepted for use as acceptance tests.

4-1.04 CERTIFICATES OF COMPLIANCE

- A Certificate of Compliance shall be furnished prior to the use of any materials for which the special provisions require that a Certificate of Compliance be furnished. In addition, the Engineer may permit the use of certain materials or assemblies prior to sampling and testing if accompanied by a Certificate of Compliance. The certificate shall be signed by the manufacturer of the material or the manufacturer of assembled materials and shall state that the materials involved comply in all respects with the requirements of the special provisions. A Certificate of Compliance shall be furnished with each lot of such materials delivered to the work and the lot so certified shall be clearly identified in the certificate.
- Materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the work which conforms to the requirements of the plans and special provisions and any material not conforming to those requirements will be subject to rejection whether in place or not.
- The Department reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance.
- The form of the Certificate of Compliance and its disposition shall be as directed by the Engineer.

SECTION 5

LEGAL RELATIONS AND RESPONSIBILITIES

5-1.01 LAWS TO BE OBSERVED

The Contractor shall keep informed of and observe, and comply with and cause all of his agents and employees to observe and comply with all prevailing Federal and State laws, and rules and regulations made pursuant to the Federal and State laws, and county and municipal ordinances, and regulations, which in any way affect the conduct of the work of the contract. If any conflict arises between provisions of the contract and any laws above referred to, the Contractor shall notify the Engineer at once in writing. The Contractor shall protect and indemnify the State or any of its officers, agents, and servants against any claim or liability arising from or based on the violation of any law, rule, or regulation, whether by the Contractor or the Contractor's agents or employees.

5-1.01A Hours of Labor

Eight hours labor constitutes a legal day's work. The Contractor or any subcontractor under the Contractor shall forfeit, as a penalty to the State of California, $25 for each worker employed in the execution of the contract by the respective Contractor or subcontractor for each calendar day during which that worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week in violation of the provisions of the Labor Code, and in particular, Section 1810 to Section 1815, thereof, inclusive, except that work performed by employees of Contractors in excess of 8 hours per day, and 40 hours during any one week, shall be permitted upon compensation for all hours worked in excess of 8 hours per day at not less than one and one-half times the basic rate of pay, as provided in Section 1815 thereof.

5-1.01B Labor Nondiscrimination

Attention is directed to Section 1735 of the Labor Code, which reads as follows:

> "No discrimination shall be made in the employment of persons upon public works because of the race, religious creed, color, national origin, ancestry, physical handicap, medical condition, marital status, or sex of such persons, except as provided in Section 12940 of the Government Code and every contractor for public works violating this section is subject to all the penalties imposed for a violation of this chapter."

Attention is directed to the following "Nondiscrimination Clause" that is required by Chapter 5 of Division 4 of Title 2, California Code of Regulations:

NONDISCRIMINATION CLAUSE

1. During the performance of this contract, contractor and its subcontractors shall not unlawfully discriminate against any employee or applicant for employment because of race, religion, color, national origin, ancestry, physical handicap, medical condition, marital status, age (over 40) or sex. Contractors and subcontractors shall ensure that the evaluation and treatment of their employees and applicants for employment are free of such discrimination. Contractors and subcontractors shall comply with the provisions of the Fair Employment and Housing Act (Gov. Code, Section 12990 et seq.) and the applicable regulations promulgated thereunder (California Code of Regulations, Title 2, Section 7285.0 et seq.). The applicable regulations of the Fair Employment and Housing Commission implementing Government Code, Section 12990, set forth in Chapter 5 of Division 4 of Title 2 of the California Code of Regulations are incorporated into this contract by reference and made a part hereof as if set forth in full. Contractor and its subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.
2. This Contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under the contract.

STANDARD CALIFORNIA NONDISCRIMINATION CONSTRUCTION CONTRACT SPECIFICATIONS (GOVERNMENT CODE, SECTION 12990)

These specifications are applicable to all nonexempt State contracts and subcontracts, and to the "Standard California Nondiscrimination Construction Contract Specifications" set forth herein. The specifications are applicable to all nonexempt State construction contracts and subcontracts of $5,000 or more.

1. As used in the specifications:

   a. "Administrator" means Administrator, Office of Compliance Programs, California Department of Fair Employment and Housing, or any person to whom the Administrator delegates authority;
   b. "Minority" includes:

      (i) Black (all persons having primary origins in any of the black racial groups of Africa, but not of Hispanic origin);
      (ii) Hispanic (all persons of primary culture or origin in Mexico, Puerto Rico, Cuba, Central or South America or other Spanish derived culture or origin regardless of race);
      (iii) Asian/Pacific Islander (all persons having primary origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent or the Pacific Islands); and
      (iv) American Indian/Alaskan Native (all persons having primary origins in any of the original peoples of North America and who maintain culture identification through tribal affiliation or community recognition).

2. Whenever the contractor or any subcontractor subcontracts a portion of the work, it shall physically include in each subcontract of $5,000 or more the nondiscrimination clause in this contract directly or through incorporation by reference. Any subcontract for work involving a construction trade shall also include the Standard California Construction Contract Specifications, either directly or through incorporation by reference.
3. The contractor shall implement the specific nondiscrimination standards provided in paragraphs 6(a) through (e) of these specifications.
4. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the contractor's obligations under these specifications, Government Code, Section 12990, or the regulations promulgated pursuant thereto.
5. In order for the nonworking training hours of apprentices and trainees to be counted, such apprentices and trainees must be employed by the contractor during the training period, and the contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor or the California Department of Industrial Relations.
6. The contractor shall take specific actions to implement its nondiscrimination program. The evaluation of the contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The contractor must be able to demonstrate fully its efforts under Steps a. through e. below:

   a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and at all facilities at which the contractor's employees are assigned to work. The contractor, where possible, will assign two or more women to each construction project. The contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the contractor's obligations to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
   b. Provide written notification within seven days to the director of DFEH when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
   c. Disseminate the Contractor's equal employment opportunity policy by providing notice of the policy to unions and training, recruitment and outreach programs and requesting their cooperation in assisting the Contractor to meet its obligations; and by posting the company policy on bulletin boards accessible to all employees at each location where construction work is performed.
   d. Ensure all personnel making management and employment decisions regarding hiring, assignment, layoff, termination, conditions of work, training, rates of pay or other employment decisions, including all supervisory personnel, superintendents, general foremen, on-site foremen, etc., are aware of the Contractor's equal employment opportunity policy and obligations, and discharge their responsibilities accordingly.

e. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the equal employment opportunity policy and the Contractor's obligations under these specifications are being carried out.

7. Contractors are encouraged to participate in voluntary associations which assist in fulfilling their equal employment opportunity obligations. The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's.
8. The Contractor is required to provide equal employment opportunity for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Fair Employment and Housing Act (Gov. Code, Section 12990 et seq.) if a particular group is employed in a substantially disparate manner.
9. Establishment and implementation of a bona fide affirmative action plan pursuant to Section 8104 (b) of this Chapter shall create a rebuttal presumption that a contractor is in compliance with the requirements of Section 12990 of the Government Code and its implementing regulations.
10. The Contractor shall not use the nondiscrimination standards to discriminate against any person because of race, color, religion, sex, national origin, ancestry, physical handicap, medical condition, marital status or age over 40.
11. The Contractor shall not enter into any subcontract with any person or firm decertified from state contracts pursuant to Government Code Section 12990.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and the nondiscrimination clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Government Code Section 12990 and its implementing regulations by the awarding agency. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Government Code Section 12990.
13. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company equal employment opportunity policy is being carried out, to submit reports relating to the provisions hereof as may be required by OCP and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status, (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in any easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

NOTE: Authority cited: Sections 12935(a) and 12990(d), Government Code. Reference: Section 12990, Government Code.

5-1.01C Prevailing Wage

- The Contractor and any subcontractor under the Contractor shall comply with Labor Code Sections 1774 and 1775. Pursuant to Section 1775, the Contractor and any subcontractor under the Contractor shall forfeit to the State or political subdivision on whose behalf the contract is made or awarded a penalty of not more than fifty dollars ($50) for each calendar day, or portion thereof, for each worker paid less than the prevailing rates as determined by the Director of Industrial Relations for the work or craft in which the worker is employed for any public work done under the contract by the Contractor or by any subcontractor under the Contractor in violation of the provisions of the Labor Code and in particular, Labor Code Sections 1770 to 1780, inclusive. The amount of this forfeiture shall be determined by the Labor Commissioner and shall be based on consideration of the mistake, inadvertence, or neglect of the Contractor or subcontractor in failing to pay the correct rate of prevailing wages, or the previous record of the Contractor or subcontractor in meeting their respective prevailing wage obligations, or the willful failure by the Contractor or subcontractor to pay the correct rates of prevailing wages. A mistake, inadvertence, or neglect in failing to pay the correct rate of prevailing wages is not excusable if the Contractor or subcontractor had knowledge of their obligations under the Labor Code. In addition to the penalty and pursuant to Labor Code Section 1775, the difference between the prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by the Contractor or subcontractor. If a worker employed by a subcontractor on a public works project is not paid the general prevailing per diem wages by the subcontractor, the prime contractor of the project is not liable for the penalties described above unless the prime contractor had knowledge of that failure of the subcontractor to pay the specified prevailing rate of wages to those workers or unless the prime contractor fails to comply with all of the following requirements:

    1. The contract executed between the contractor and the subcontractor for the performance of work on the public works project shall include a copy of the provisions of Sections 1771, 1775, 1776, 1777.5, 1813, and 1815 of the Labor Code.
    2. The contractor shall monitor the payment of the specified general prevailing rate of per diem wages by the subcontractor to the employees, by periodic review of the certified payroll records of the subcontractor.
    3. Upon becoming aware of the subcontractor's failure to pay the specified prevailing rate of wages to the subcontractor's workers, the contractor shall diligently take corrective action to halt or rectify the failure, including, but not limited to, retaining sufficient funds due the subcontractor for work performed on the public works project.
    4. Prior to making final payment to the subcontractor for work performed on the public works project, the contractor shall obtain an affidavit signed under penalty of perjury from the subcontractor that the subcontractor has paid the specified general prevailing rate of per diem wages to the subcontractor's employees on the public works project and any amounts due pursuant to Section 1813 of the Labor Code.

- Pursuant to Section 1775 of the Labor Code, the Division of Labor Standards Enforcement shall notify the Contractor on a public works project within 15 days of the receipt by the Division of Labor Standards Enforcement of a complaint of the failure of a subcontractor on that public works project to pay workers the general prevailing rate of per diem wages. If the Division of Labor Standards Enforcement determines that employees of a subcontractor were not paid the general prevailing rate of per diem wages and if the Department did not retain sufficient money under the contract to pay those employees the balance of wages owed under the general prevailing rate of per diem wages, the contractor shall withhold an amount of moneys due the subcontractor sufficient to pay those employees the general prevailing rate of per diem wages if requested by the Division of Labor Standards Enforcement. The Contractor shall pay any money retained from and owed to a subcontractor upon receipt of notification by the Division of Labor Standards Enforcement that the wage complaint has been resolved. If notice of the resolution of the wage complaint has not been received by the Contractor within 180 days of the filing of a valid notice of completion or acceptance of the public works project, whichever occurs later, the Contractor shall pay all moneys retained from the subcontractor to the Department. These moneys shall be retained by the Department pending the final decision of an enforcement action.

- Pursuant to the provisions of Section 1773 of the Labor Code, the Department has obtained the general prevailing rate of wages (which rate includes employer payments for health and welfare, pension, vacation, travel time, and subsistence pay as provided for in Section 1773.8 of the Labor Code, apprenticeship or other training programs authorized by Section 3093 of the Labor Code, and similar purposes) applicable to the work to be done, for straight time, overtime, Saturday, Sunday and holiday work. The holiday wage rate listed shall be applicable to all holidays recognized in the collective bargaining agreement of the particular craft, classification or type of workmen concerned. The general prevailing wage rates and any applicable changes to these wage rates are available at the Labor Compliance Office at the offices of the District Director of Transportation for the district in which the work is situated. For work situated in District 9, the wage rates are available at the Labor Compliance Office at the offices of the District Director of Transportation for District 6, located at Fresno. General prevailing wage rates are also available from the California Department of Industrial Relations' internet web site at: http://www.dir.ca.gov.
- The wage rates determined by the Director of Industrial Relations for the project refer to expiration dates. Prevailing wage determinations with a single asterisk after the expiration date are in effect on the date of advertisement for bids and are good for the life of the contract. Prevailing wage determinations with double asterisks after the expiration date indicate that the wage rate to be paid for work performed after this date has been determined. If work is to extend past this date, the new rate shall be paid and incorporated in the contract. The Contractor shall contact the Department of Industrial Relations as indicated in the wage rate determinations to obtain predetermined wage changes.
- Pursuant to Section 1773.2 of the Labor Code, general prevailing wage rates shall be posted by the Contractor at a prominent place at the site of the work.
- Changes in general prevailing wage determinations which conform to Labor Code Section 1773.6 and Title 8 California Code of Regulations Section 16204 shall apply to the project when issued by the Director of Industrial Relations at least 10 days prior to the date of the Notice to Contractors for the project.
- The State will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the prevailing wage rate set forth in the contract. The possibility of wage increases is one of the elements to be considered by the Contractor in determining the bid, and will not under any circumstances be considered as the basis of a claim against the State on the contract.

5-1.01D Travel And Subsistence Payments

Attention is directed to the requirements in Section 1773.8 of the Labor Code. The Contractor shall make travel and subsistence payments to each workman, needed to execute the work, in conformance with the requirements in Labor Code Section 1773.8.

5-1.01E Payroll Records

- Attention is directed to the provisions of Labor Code Section 1776, a portion of which is quoted below. Regulations implementing Labor Code Section 1776 are located in Sections 16016 through 16019 and Sections 16207.10 through 16207.19 of Title 8, California Code of Regulations.

"1776. (a) Each contractor and subcontractor shall keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following:

(1) The information contained in the payroll record is true and correct.
(2) The employer has complied with the requirements of Sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project.

"(b) The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours at the principal office of the contractor on the following basis:

(1) A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request.
(2) A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection or furnished upon request to a representative of the body awarding the contract, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations.

(3) A certified copy of all payroll records enumerated in subdivision (a) shall be made available upon request by the public for inspection or for copies thereof. However, a request by the public shall be made through either the body awarding the contract, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to paragraph (2), the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the contractor, subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the contractor.

"(c) The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division.

"(d) A contractor or subcontractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested the records within 10 days after receipt of a written request.

"(e) Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement shall be marked or obliterated in a manner so as to prevent disclosure of an individual's name, address, and social security number. The name and address of the contractor awarded the contract or the subcontractor performing the contract shall not be marked or obliterated.

"(f) The contractor shall inform the body awarding the contract of the location of the records enumerated under subdivision (a), including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.

"(g) The contractor or subcontractor shall have 10 days in which to comply subsequent to receipt of a written notice requesting the records enumerated in subdivision (a). In the event that the contractor or subcontractor fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit twenty-five dollars ($25) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. A contractor is not subject to a penalty assessment pursuant to this section due to the failure of a subcontractor to comply with this section."

- The penalties specified in subdivision (g) of Labor Code Section 1776 for noncompliance with the provisions of Section 1776 may be deducted from any moneys due or which may become due to the Contractor.
- A copy of all payrolls shall be submitted weekly to the Engineer. Payrolls shall contain the full name, address and social security number of each employee, the employee's correct classification, rate of pay, daily and weekly number of hours worked, itemized deductions made and actual wages paid. They shall also indicate apprentices and ratio of apprentices to journeymen. The employee's address and social security number need only appear on the first payroll on which that name appears. The payroll shall be accompanied by a "Statement of Compliance" signed by the employer or the employer's agent indicating that the payrolls are correct and complete and that the wage rates contained therein are not less than those required by the contract. The "Statement of Compliance" shall be on forms furnished by the Department or on any form with identical wording. The Contractor shall be responsible for the submission of copies of payrolls of all subcontractors.
- If by the 15th of the month, the Contractor has not submitted satisfactory payrolls for all work performed during the monthly period ending on or before the 1st of that month, the Department will retain an amount equal to 10 percent of the estimated value of the work performed during the month from the next monthly estimate, except that this retention shall not exceed $10,000 nor be less than $1,000. Retentions for failure to submit satisfactory payrolls shall be additional to all other retentions provided for in the contract. The retention for failure to submit payrolls for any monthly period will be released for payment on the monthly estimate for partial payments next following the date that all the satisfactory payrolls for which the retention was made are submitted.
- The Contractor and each subcontractor shall preserve their payroll records for a period of 3 years from the date of completion of the contract.

5-1.01F Trench Safety

- Attention is directed to the provisions of Section 6705 of the Labor Code concerning trench excavation safety plans.
- The Construction Safety Orders of the Division of Occupational Safety and Health shall apply to all excavations. For all excavations 1.5 m or more in depth, the Contractor shall submit to the Engineer a detailed plan showing the design and details of the protective systems to be provided for worker protection from the hazard of caving ground during excavation. The detailed plan shall include any tabulated data and any design calculations used in the preparation of the plan. Excavation shall not begin until the detailed plan has been reviewed and approved by the Engineer.

- Detailed plans of protective systems for which the Construction Safety Orders require design by a registered professional engineer shall be prepared and signed by an engineer who is registered as a Civil Engineer in the State of California, and shall include the soil classification, soil properties, soil design calculations that demonstrate adequate stability of the protective system, and any other design calculations used in the preparation of the plan.
- No plan shall allow the use of a protective system less effective than that required by the Construction Safety Orders.
- If the detailed plan includes designs of protective systems developed only from the allowable configurations and slopes, or Appendices, contained in the Construction Safety Orders, the plan shall be submitted at least 5 days before the Contractor intends to begin excavation. If the detailed plan includes designs of protective systems developed from tabulated data, or designs for which design by a registered professional engineer is required, the plan shall be submitted at least 3 weeks before the Contractor intends to begin excavation.
- In addition to these provisions detailed plans of the protective systems for excavations on or affecting railroad property will be reviewed for adequacy of protection provided for railroad facilities, property, and traffic. These plans for excavations on or affecting railroad property shall be submitted at least 9 weeks before the Contractor intends to begin excavation requiring the protective systems. Approval by the Engineer of the detailed plans for the protective systems will be contingent upon the plans being satisfactory to the railroad company involved.

5-1.01G Apprentices

- Attention is directed to Sections 1777.5, 1777.6 and 1777.7 of the California Labor Code and Title 8, California Code of Regulations Section 200 et seq. To ensure compliance and complete understanding of the law regarding apprentices, and specifically the required ratio thereunder, each contractor or subcontractor should, where some question exists, contact the Division of Apprenticeship Standards, 455 Golden Gate Avenue, San Francisco, CA 94102, or one of its branch offices prior to commencement of work on the public works contract. Responsibility for compliance with this section lies with the prime Contractor.
- It is State policy to encourage the employment and training of apprentices on public works contracts as may be permitted under local apprenticeship standards.

5-1.01H Fair Labor Standards Act

- The attention of bidders is invited to the fact that the State of California, Department of Transportation, has been advised by the Wage and Hour Division, U.S. Department of Labor, that contractors engaged in construction work are required to meet the provisions of the Fair Labor Standards Act of 1938 and as amended (52 Stat. 1060).

5-1.01I Workers' Compensation

- Pursuant to the requirements in Section 1860 of the Labor Code, the Contractor will be required to secure the payment of workers' compensation to the Contractor's employees in conformance with the requirements in Section 3700 of the Labor Code.
- Prior to the commencement of work, the Contractor shall sign and file with the Engineer a certification in the following form:

> "I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with the provisions of Section 3700 before commencing the performance of the work of this contract."

- This certification is included in the contract, and signature and return of the contract as provided in Section 2-1.04, "Execution of Contract," of the Instructions to Bidders shall constitute signing and filing of the certificate.

5-1.01J Air Pollution Control

- The Contractor shall comply with all air pollution control rules, regulations, ordinances and statutes which apply to any work performed pursuant to the contract, including any air pollution control rules, regulations, ordinances and statutes, specified in Section 11017 of the Government Code.
- Unless otherwise provided in the special provisions, material to be disposed of shall not be burned, either inside or outside the premises.

5-1.01K Use Of Pesticides

- The Contractor shall comply with all rules and regulations of the Department of Food and Agriculture, the Department of Health, the Department of Industrial Relations and all other agencies which govern the use of pesticides required in the performance of the work on the contract.
- Pesticides shall include but shall not be limited to herbicides, insecticides, fungicides, rodenticides, germicides, nematocides, bactericides, inhibitors, fumigants, defoliants, desiccants, soil sterilants, and repellents.

- Any substance or mixture of substances intended for preventing, repelling, mitigating, or destroying weeds, insects, diseases, rodents, or nematodes and any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant shall be considered a pesticide.

5-1.01L Sound Control Requirements

- The Contractor shall comply with all local sound control and noise level rules, regulations and ordinances which apply to any work performed pursuant to the contract.
- Each internal combustion engine, used for any purpose on the job or related to the job, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without the muffler.

5-1.01M Environmental Clearances

- The Department will obtain all environmental clearances and authorizations necessary for the project as set forth in the plans and specifications. The Contractor shall comply with the provisions, including giving notices during construction when required, of these authorizations. In the event the obtaining of these authorizations delays completion of all or any portion of the work, an extension of time determined pursuant to the provisions in Section 6-1.08, "Liquidated Damages," of these General Conditions will be granted and the Contractor shall not be entitled to any additional compensation because of the delays.

5-1.01N Permits And Licenses

- The Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work.
- The Environmental Quality Act (Public Resources Code, Sections 21000 to 21176, inclusive) may be applicable to permits, licenses and other authorizations which the Contractor must obtain from local agencies in connection with performing the work of the contract. The Contractor shall comply with the provisions of those statutes in obtaining the permits, licenses and other authorizations and they shall be obtained in sufficient time to prevent delays to the work.
- In the event that the Department has obtained permits, licenses or other authorizations, applicable to the work, in conformance with the requirements in the Environmental Quality Act, the Contractor shall comply with the provisions of those permits, licenses and other authorizations.

5-1.01O Assignment Of Antitrust Actions

- The Contractor's attention is directed to the following requirements in Public Contract Code 7103.5 and Government Code Sections 4553 and 4554, which shall be applicable to the Contractor and the Contractor's subcontractors:

> "In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the contractor or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the contractor, without further acknowledgement by the parties."
>
> "If an awarding body or public purchasing body receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under this chapter, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the public body any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the public body as part of the bid price, less the expenses incurred in obtaining that portion of the recovery.
>
> "Upon demand in writing by the assignor, the assignee shall, within one year from such demand, reassign the cause of action assigned under this part if the assignor has been or may have been injured by the violation of law for which the cause of action arose and (a) the assignee has not been injured thereby, or (b) the assignee declines to file a court action for the cause of action."

5-1.01P Safety And Health Provisions

- The Contractor shall conform to all applicable occupational safety and health standards, rules, regulations and orders established by the State of California.
- Working areas utilized by the Contractor to perform work during the hours of darkness, shall be lighted to conform to the minimum illumination intensities established by California Division of Occupational Safety and Health Construction Safety Orders.
- All lighting fixtures shall be mounted and directed in a manner precluding glare to approaching traffic.

5-1.01Q Suits To Recover Penalties And Forfeitures

- Attention is directed to Sections 1730 to 1733, inclusive, of the Labor Code concerning suits to recover amounts withheld from payment for failure to comply with requirements of the Labor Code or contract provisions based on those laws.
- Those sections provide that a suit on the contract for alleged breach thereof in not making the payment is the exclusive remedy of the Contractor or the Contractor's assignees with reference to amounts withheld for those penalties or forfeitures; and that the suit must be commenced and actual notice thereof received by the awarding authority prior to 90 days after completion of the contract and the formal acceptance of the job.
- Submission of a claim under Section 7-1.07, "Final Payment and Claims," of these General Conditions for the amounts withheld from payment for those penalties and forfeitures is not a prerequisite for those suits and these claims will not be considered.

5-1.01R Water Pollution

- The Contractor shall exercise every reasonable precaution to protect streams, lakes, reservoirs, bays, and coastal waters from pollution with fuels, oils, bitumens, calcium chloride and other harmful materials and shall conduct and schedule operations so as to avoid or minimize muddying and silting of streams, lakes, reservoirs, bays and coastal waters. Care shall be exercised to preserve roadside vegetation beyond the limits of construction.
- Water pollution control work is intended to provide prevention, control, and abatement of water pollution to streams, waterways, and other bodies of water, and shall consist of constructing those facilities which may be shown on the plans, specified herein or in the special provisions, or directed by the Engineer.
- In order to provide effective and continuous control of water pollution it may be necessary for the Contractor to perform the contract work in small or multiple units, on an out of phase schedule, and with modified construction procedures. The Contractor shall provide temporary water pollution control measures, including but not limited to, dikes, basins, ditches, and applying straw and seed, which become necessary as a result of the Contractor’s operations. The Contractor shall coordinate water pollution control work with all other work done on the contract.
- Before starting any work on the project, the Contractor shall submit, for acceptance by the Engineer, a program to control water pollution effectively during construction of the project. The program shall show the schedule for the erosion control work included in the contract and for all water pollution control measures which the Contractor proposes to take in connection with construction of the project to minimize the effects of the operations upon adjacent streams and other bodies of water. The Contractor shall not perform any clearing and grubbing or earthwork on the project, other than that specifically authorized in writing by the Engineer, until the program has been accepted.
- If the measures being taken by the Contractor are inadequate to control water pollution effectively, the Engineer may direct the Contractor to revise the operations and the water pollution control program. The directions will be in writing and will specify the items of work for which the Contractor’s water pollution control measures are inadequate. No further work shall be performed on those items until the water pollution control measures are adequate and, if also required, a revised water pollution control program has been accepted.
- The Engineer will notify the Contractor of the acceptance or rejection of any submitted or revised water pollution control program in not more than 5 working days.
- The State will not be liable to the Contractor for failure to accept all or any portion of an originally submitted or revised water pollution control program, nor for any delays to the work due to the Contractor’s failure to submit an acceptable water pollution control program.
- The Contractor may request the Engineer to waive the requirement for submission of a written program for control of water pollution when the nature of the Contractor’s operation is such that erosion is not likely to occur. Waiver of this requirement will not relieve the Contractor from responsibility for compliance with the other provisions of this section. Waiver of the requirement for a written program for control of water pollution will not preclude requiring submittal of a written program at a later time if the Engineer deems it necessary because of the effect of the Contractor’s operations.
- Unless otherwise approved by the Engineer in writing, the Contractor shall not expose a total area of erosible earth material, which may cause water pollution, exceeding 70 000 m^2 for each separate location, operation, or spread of equipment before either temporary or permanent erosion control measures are accomplished.
- Where erosion which will cause water pollution is probable due to the nature of the material or the season of the year, the Contractor’s operations shall be so scheduled that permanent erosion control features will be installed concurrently with or immediately following grading operations.
- Nothing in the terms of the contract nor in the provisions in this Section 5-1.01R shall relieve the Contractor of the responsibility for compliance with Sections 5650 and 12015 of the Fish and Game Code, or other applicable statutes relating to prevention or abatement of water pollution.

- When borrow material is obtained from other than commercially operated sources, erosion of the borrow site during and after completion of the work shall not result in water pollution. The material source shall be finished, where practicable, so that water will not collect or stand therein.
- The requirements of this section shall apply to all work performed under the contract and to all non-commercially operated borrow or disposal sites used for the project.
- The Contractor shall also conform to the following provisions:

1. Where working areas encroach on live streams, barriers adequate to prevent the flow of muddy water into streams shall be constructed and maintained between working areas and streams, and during construction of the barriers, muddying of streams shall be held to a minimum.

2. Removal of material from beneath a flowing stream shall not be commenced until adequate means, such as a bypass channel, are provided to carry the stream free from mud or silt around the removal operations.

3. Should the Contractor's operations require transportation of materials across live streams, the operations shall be conducted without muddying the stream. Mechanized equipment shall not be operated in the stream channels of the live streams except as may be necessary to construct crossings or barriers and fills at channel changes.

4. Water containing mud or silt from aggregate washing or other operations shall be treated by filtration, or retention in a settling pond, or ponds, adequate to prevent muddy water from entering live streams.

5. Oily or greasy substances originating from the Contractor's operations shall not be allowed to enter or be placed where they will later enter a live stream.

6. Portland cement or fresh portland cement concrete shall not be allowed to enter flowing water of streams.

7. When operations are completed, the flow of streams shall be returned as nearly as possible to a meandering thread without creating possible future bank erosion, and settling pond sites shall be graded so they will drain and will blend in with the surrounding terrain.

8. Material derived from roadway work shall not be deposited in a live stream channel where it could be washed away by high stream flows.

9. Where there is possible migration of anadromous fish in streams affected by construction on the project, the Contractor shall conduct work operations so as to allow free passage of the migratory fish.

- Compliance with the requirements of this section shall in no way relieve the Contractor from the responsibility to comply with the other provisions of the contract, in particular the responsibility for damage and for preservation of property.

5-1.02 PROTECTION AND USE OF PROPERTY

- The Contractor shall be responsible for and provide and maintain all proper temporary walks, roads, guards, railings, lights, warning signs, and take precaution at all times to avoid injury or damage to any person or any property, and upon completion of the work, or at other times as directed, restore premises and adjacent property to a proper condition.
- The Contractor shall protect adjoining property and nearby buildings, including State buildings, State roads, and public streets or roads, from dust, dirt, debris, or other nuisance arising out of the Contractor's operations or storage practices, and, if ordered by the Engineer, the Contractor shall provide and install suitable safeguards, approved by the Engineer, to protect objects from damage. If any objects are injured or damaged by reason of the Contractor's operations, they shall be replaced or restored at the Contractor's expense. The facilities shall be replaced or restored to a condition as good as when the Contractor entered upon the work, or as good as required by the specifications accompanying the contract, if any of the objects are a part of the work being performed under the contract.
- If the Contractor damages any buildings, roads or other property which belong to the State, or any department or agency thereof, then the Engineer, at his option, may retain from the money due under the contract an amount sufficient to insure repair of the damage.
- The Engineer may make or cause to be made those temporary repairs that are necessary to restore to service any damaged highway facility. The cost of the repairs shall be borne by the Contractor and may be deducted from any moneys due or to become due to the Contractor under the contract.

• The fact that any underground facility is not shown upon the plans shall not relieve the Contractor of the responsibility of protecting underground improvements or facilities. It shall be the Contractor's responsibility, pursuant thereto, to ascertain the location of those underground improvements or facilities, which may be subject to damage by reason of the Contractor's operations.

5-1.03 (BLANK)

5-1.031 INDEMNIFICATION

• With the exception that this section shall in no event be construed to require indemnification by the Contractor to a greater extent than permitted by law, the Contractor shall defend, indemnify and save harmless the State, including its officers, directors, agents (excluding agents who are design professionals), and employees, and each of them (Indemnitees), from any and all claims, demands, causes of action, damages, costs, expenses, actual attorneys' fees, losses or liabilities, in law or in equity, of every kind and nature whatsoever (Claims), arising out of or in connection with the Contractor's performance of this contract for:

A. Bodily injury including, but not limited to, bodily injury, sickness or disease, emotional injury or death to persons, including, but not limited to, the public, any employees or agents of the Contractor, State, Department, or any other contractor and;
B. Damage to property of anyone including loss of use thereof;

caused or alleged to be caused in whole or in part by any negligent or otherwise legally actionable act or omission of the Contractor or anyone directly or indirectly employed by the Contractor or anyone for whose acts the Contractor may be liable.

• Except as otherwise provided by law, the indemnification provisions above shall apply regardless of the existence or degree of fault of Indemnitees. The Contractor, however, shall not be obligated to indemnify Indemnitees for Claims arising from conduct delineated in Civil Code section 2782. Further, the Contractor's indemnity obligation shall not extend to Claims to the extent they arise from any defective or substandard condition of the roadway which existed at or prior to the time the Contractor commenced work, unless this condition has been changed by the work or the scope of the work requires the Contractor to maintain existing Roadway facilities and the claim arises from the Contractor's failure to maintain. The Contractor's indemnity obligation shall extend to Claims arising after the work is completed and accepted only if these Claims are directly related to alleged acts or omissions of the Contractor which occurred during the course of the work. No inspection by the Department, its employees or agents shall be deemed a waiver by the Department of full compliance with the requirements of this section.

• The Contractor's obligation to defend and indemnify shall not be excused because of the Contractor's inability to evaluate liability or because the Contractor evaluates liability and determines that the Contractor is not liable to the claimant. The Contractor will respond within 30 days to the tender of any claim for defense and indemnity by the State, unless this time has been extended by the State. If the Contractor fails to accept or reject a tender of defense and indemnity within 30 days, in addition to any other remedy authorized by law, so much of the money due the Contractor under and by virtue of the contract as shall reasonably be considered necessary by the Department, may be retained by the State until disposition has been made of the claim or suit for damages, or until the Contractor accepts or rejects the tender of defense, whichever occurs first.

• With respect to third party claims against the Contractor, the Contractor waives any and all rights of any type to express or implied indemnity against the State, its directors, officers, employees, or agents (excluding agents who are design professionals).

5-1.032 INSURANCE

• Insurance shall conform to the following requirements:

5-1.032A Casualty Insurance

• The Contractor shall, at the Contractor's expense, procure and maintain insurance on all of its operations with companies acceptable to the Department as follows. All insurance shall be kept in full force and effect from the beginning of the work through final acceptance by the State. In addition, the Contractor shall maintain completed operations coverage with a carrier acceptable to the Department through the expiration of the patent deficiency in construction statute of repose set forth in Section 337.1 of the Code of Civil Procedure.

5-1.032A(1) Workers' Compensation and Employer's Liability Insurance

• Workers' Compensation insurance shall be provided as specified in Section 7-1.01A(6), "Workers' Compensation." Employer's Liability Insurance shall be provided in amounts not less than:

(a) $1,000,000 for each accident for bodily injury by accident.
(b) $1,000,000 policy limit for bodily injury by disease.
(c) $1,000,000 for each employee for bodily injury by disease.

- If there is an exposure of injury to the Contractors' employees under the U.S. Longshoremen's and Harbor Workers' Compensation Act, the Jones Act or under laws, regulations or statutes applicable to maritime employees, coverage shall be included for such injuries or claims.

5-1.032A(2) Liability Insurance

- The Contractor shall carry General Liability and Umbrella or Excess Liability Insurance covering all operations by or on behalf of the Contractor providing insurance for bodily injury liability, and property damage liability for the limits of liability indicated below and including coverage for:

(a) premises, operations and mobile equipment
(b) products and completed operations
(c) broad form property damage (including completed operations)
(d) explosion, collapse and underground hazards
(e) personal injury
(f) contractual liability

5-1.032A(3) Liability Limits/Additional Insureds

- The limits of liability shall be at least:

(a) $1,000,000 for each occurrence (combined single limit for bodily injury and property damage).
(b) $2,000,000 aggregate for products-completed operations.
(c) $2,000,000 general aggregate. This general aggregate limit shall apply separately to the Contractor's work under this Agreement.
(d) $5,000,000 umbrella or excess liability. For projects over $25,000,000 only, an additional $10,000,000 umbrella or excess liability (for a total of $15,000,000). Umbrella or excess policy shall include products liability completed operations coverage and may be subject to $5,000,000 or $15,000,000 aggregate limits. Further, the umbrella or excess policy shall contain a clause stating that it takes effect (drops down) in the event the primary limits are impaired or exhausted.

- The State and the Department, including their officers, directors, agents (excluding agents who are design professionals), and State employees, shall be named as additional insureds under the General Liability and Umbrella Liability Policies with respect to liability arising out of or connected with work or operations performed by or on behalf of the Contractor under this contract. Coverage for those additional insureds shall not extend to liability:

(1) arising from any defective or substandard condition of the Roadway which existed at or prior to the time the Contractor commenced work, unless that condition has been changed by the work or the scope of the work requires the Contractor to maintain existing Roadway facilities and the claim arises from the Contractor's failure to maintain; or
(2) for claims occurring after the work is completed and accepted unless these claims are directly related to alleged acts or omissions of the Contractor which occurred during the course of the work; or
(3) to the extent prohibited by Section 11580.04 of the Insurance Code.

- The policy shall stipulate that the insurance afforded the additional insureds shall apply as primary insurance. Any other insurance or self insurance maintained by the Department or State will be excess only and shall not be called upon to contribute with this insurance. Those additional insured coverage shall be provided by a policy provision or by an endorsement providing coverage at least as broad as Additional Insured (Form B) endorsement form CG 2010, as published by the Insurance Services Office (ISO).

5-1.032B Automobile Liability Insurance

- The Contractor shall carry automobile liability insurance, including coverage for all owned, hired and non-owned automobiles. The primary limits of liability shall be not less than $1,000,000 combined single limit each accident for bodily

injury and property damage. The umbrella or excess liability coverage required under Section 5-1.032A(3), "Liability Limits/Additional Insureds," shall also apply to automobile liability.

5-1.032C Policy Forms, Endorsements and Certificates

- The Contractor's General Liability Insurance shall be provided under Commercial General Liability policy form no. CG0001 as published by the Insurance Services Office (ISO) or under a policy form at least as broad as policy form no. CG0001.
- Evidence of insurance in a form acceptable to the Department, including the required "additional insured" endorsements, shall be furnished by the Contractor to the Department at or prior to the pre-construction conference. The evidence of insurance shall provide that there will be no cancellation, lapse, or reduction of coverage without thirty (30) days' prior written notice to the Department. Certificates of Insurance, as evidence of required insurance, for the General Liability, Auto Liability and Umbrella-Excess Liability policies shall set forth deductible amounts applicable to each policy and all exclusions which are added by endorsement to each policy. The Department may expressly allow deductible clauses, which it does not consider excessive, overly broad, or harmful to the interests of the State. Standard ISO form CG 0001 or similar exclusions will be allowed provided they are not inconsistent with the requirements of this section. Allowance of any additional exclusions is at the discretion of the Department. Regardless of the allowance of exclusions or deductions by the Department, the Contractor shall be responsible for any deductible amount and shall warrant that the coverage provided to the Department is consistent with the requirements of this section.

5-1.032D Enforcement

- The Department may take any steps as are necessary to assure Contractor's compliance with its obligations. Should any insurance policy lapse or be canceled during the contract period the Contractor shall, within thirty (30) days prior to the effective expiration or cancellation date, furnish the Department with evidence of renewal or replacement of the policy. Failure to continuously maintain insurance coverage as herein provided is a material breach of contract. In the event the Contractor fails to maintain any insurance coverage required, the Department may, but is not required to, maintain this coverage and charge the expense to the Contractor or terminate this Agreement. The required insurance shall be subject to the approval of Department, but any acceptance of insurance certificates by the Department shall in no way limit or relieve the Contractor of the Contractor's duties and responsibilities under the Contract to indemnify, defend and hold harmless the State, its officers, agents, and employees. Insurance coverage in the minimum amounts set forth herein shall not be construed to relieve the Contractor for liability in excess of that coverage, nor shall it preclude the State from taking other actions as is available to it under any other provision of the contract or law. Failure of the Department to enforce in a timely manner any of the provisions of this section shall not act as a waiver to enforcement of any of these provisions at a later date.

5-1.032E Self-Insurance

- Self-insurance programs and self-insured retentions in insurance policies are subject to separate annual review and approval by the State of evidence of the Contractor's financial capacity to respond. Additionally, self-insurance programs or retentions must provide the State with at least the same protection from liability and defense of suits as would be afforded by first-dollar insurance.

5-1.032F Miscellaneous

- Nothing contained in the Contract is intended to make the public or any member thereof a third party beneficiary of the Insurance or Indemnity provisions of these General Conditions, nor is any term, condition or other provision of the Contract intended to establish a standard of care owed to the public or any member thereof.

5-1.04 OCCUPANCY BY THE DEPARTMENT PRIOR TO ACCEPTANCE

- The Department reserves the right to occupy all or any part of the project prior to completion of the entire contract, upon written order therefor. In that event, the Contractor will be relieved of responsibility for any injury or damage to that part as results from the Department's occupancy and use by the Department. If the Contractor carries insurance against damage to the premises or against liability to third persons covering the premises so used and occupied by the Department, and if the occupancy results in increased premiums for insurance, the Department will pay to the Contractor the added cost for insurance during the period of occupancy.
- This occupancy does not constitute acceptance by the Director either of the complete work or of any portion thereof, nor will it relieve the Contractor of full responsibility for correcting defective work or materials found at any time before the formal written acceptance of the entire contract by the Director or during the full guarantee period after project acceptance, as provided in Section 7-1.09, "Guarantee," of these General Conditions.

5-1.05 CONTRACTOR'S RESPONSIBILITY FOR THE WORK

Except as otherwise provided herein, the Contractor shall have the charge and care of the work and shall bear the risk of injury or damage to any part of the work by the action of the elements or from any other cause whether arising from the execution or from the nonexecution of the work until the acceptance of the contract by the Director. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any cause before its completion and acceptance, and shall bear the expense thereof. In case of suspension of work from any cause whatever, the Contractor shall be responsible for the work and shall also be responsible for all materials, and shall properly store them if necessary, and shall provide suitable drainage and erect temporary structures where necessary.

The Contractor will be relieved of responsibility for any injury or damage to the work caused by the following:

(1) An earthquake in excess of a magnitude of 3.5 on the Richter Scale or a tidal wave, when the effect of that event has been proclaimed a disaster or state of emergency by the Governor of the State of California or by the President of the United States, or was of such magnitude at the site of the work as to have been sufficient to have caused a proclamation of disaster or state of emergency, had it occurred in a populated area.

(2) Occupancy and use by the Department or the public prior to the completion of the entire project.

(3) Acts of the Federal Government or the public enemy.

5-1.06 RESPONSIBILITY FOR UTILITIES

The Contractor shall be responsible for the cost for any and all work, expense or special precautions caused or required by the existence or proximity of utilities encountered in performing the work, including without limitation thereon, repair of any or all damage and all hand or exploratory excavation required. The Contractor is cautioned that the utilities may include communication cables or electrical cables which may be high voltage, and when working or excavating in the vicinity of any cables, or the ducts enclosing cables, the Contractor shall observe any special precautions required and the cost of these special precautions. Suitable warning signs, barricades, and safety devices shall be erected as necessary or required.

However, if during the course of the work the Contractor encounters utility installations which are not shown or indicated on the plans or in the special provisions, or which are found in a location substantially different from that shown, and the utilities are not reasonably apparent from visual examination, then the Contractor shall promptly notify the Engineer in writing. Where necessary for the work of the contract, the Engineer shall issue a written order to the Contractor to make adjustment, rearrangement, repair, removal, alteration, or special handling of the utility, including repair of utility if damaged. The Contractor shall perform the work described in the written order, and compensation therefor will be made in conformance with the provisions in Section 3, "Changes in the Work," of these General Conditions, relating to changes in the work. Except for the items of cost specified in Section 3, "Changes in the Work," of these General Conditions, the Contractor shall receive no compensation for any other cost, damage, delay, interference, or hindrance to him due to the presence of these utilities. If the Contractor fails to give the notice specified above and thereafter acts without instructions from the Engineer, then the Contractor shall be liable for any or all damage to these utilities or other work of the contract which arises from the Contractor's operations subsequent to discovery thereof, and the Contractor shall repair and make good any damage at the Contractor's expense.

5-1.07 PROPERTY RIGHTS IN MATERIALS

Nothing in the contract shall be construed as vesting in the Contractor any right of property in the materials used after they have been attached or affixed to the work or soil or after partial payment has been made as provided in Section 7-1.05, "Partial Payment," of these General Conditions for material delivered on the ground or stored subject to or under the control of the State and unused. These material shall become the property of the State of California upon being so attached or affixed or upon payment for materials delivered on the ground or stored subject to or under the control of the State and unused, as provided in Section 7-1.05, "Partial Payment," of these General Conditions.

5-1.08 LEGAL ACTIONS AGAINST THE DEPARTMENT

If, pursuant to court order, the Department temporarily suspends performance of all or any portion of the work, an extension of time determined pursuant to the provisions in Section 6-1.08, "Liquidated Damages," of these General Conditions will be granted, and the Contractor shall not be entitled to any additional compensation because of the suspension.

5-1.09 NO PERSONAL LIABILITY

Neither the Director, the Engineer, nor any other officer or authorized employee of the Department of Transportation shall be personally responsible for any liability arising under the contract.

5-1.10 PATENTS

The Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the work, and agrees to indemnify and save harmless the State of California, the Director, the Engineer, and their duly authorized representatives, from all suits at law, or actions of every nature for, or on account of the use of any patented materials, equipment, devices, or processes.

5-1.11 PAYMENT OF TAXES

The contract price paid for the work shall include full compensation for all taxes which the Contractor is required to pay, whether imposed by Federal, State or local government, including, without being limited to, Federal excise tax. No tax exemption certificate nor any document designed to exempt the Contractor from payment of any tax will be furnished to the Contractor by the Department, as to any tax on labor, services, materials, transportation, or any other items furnished pursuant to the contract.

5-1.12 COOPERATION

Should construction be under way by State forces or other forces or by other contractors within or adjacent to the limits of the work or should work of any other nature be under way by other forces within or adjacent to those limits, the Contractor shall cooperate with all the other contractors or other forces to the end that any delay, interference or hindrance to their work will be avoided. The right is reserved to perform other or additional work at or near the site at any time, by the use of other forces.

SECTION 6

PROSECUTION AND PROGRESS

6-1.01 SUBLETTING AND SUBCONTRACTING

- The Contractor shall be responsible for all work performed under the contract. All persons engaged in the work will be considered as employees of the Contractor. The Contractor shall give personal attention to the fulfillment of the contract and shall keep the work under the Contractor's control. When any subcontractor fails to prosecute a portion of the work in a manner satisfactory to the Engineer, the Contractor shall remove that subcontractor immediately upon written request of the Engineer, and the subcontractor shall not again be employed on the work. Although the sections of the contract may be arranged according to various trades, or general grouping of the work, the Contractor is not obligated to sublet the work in the same manner. The State will not arbitrate disputes among subcontractors or between the Contractor and one or more subcontractors concerning responsibility for performing any part of the work.
- Subcontracts shall include provisions that the contract between the State and the Contractor is part of the subcontract, and that all terms and provisions of the contract are incorporated in the subcontract. Subcontracts shall also contain certification by the subcontractor that the subcontractor is experienced in and qualified to do, and knowledgeable about, the subcontracted work. Copies of subcontracts shall be available to the Engineer upon written request, and shall be provided to the Engineer at the time any litigation against the State concerning the project is filed.
- Pursuant to the provisions of Section 6109 of the Public Contract Code, the Contractor shall not perform work on a public works project with a subcontractor who is ineligible to perform work on the public works project pursuant to Section 1777.1 or 1777.7 of the Labor Code.
- The Contractor shall not substitute any person as subcontractor in place of a subcontractor listed on the Contractor's bid proposal without the written approval of the Engineer. Substitutions must be in conformance with the provisions of the "Subletting and Subcontracting Fair Practices Act" beginning with Section 4100 of the Public Contract Code. Violations of this Act by the Contractor may subject him to penalties which may include cancellation of contract, assessment of 10 percent of the subcontractor's bid, and disciplinary action by the Contractors' State License Board.

6-1.02 ASSIGNMENT

- The performance of the contract may not be assigned, except upon the written consent of the Director. Consent will not be given to any proposed assignment which would relieve the original Contractor or the Contractor's surety of their responsibilities under the contract nor will the Director consent to any assignment of a part of the work under the contract.
- The Contractor may assign moneys due or to become due the Contractor under the contract and the assignment will be recognized by the Department, if given proper notice thereof, to the extent permitted by law, but any assignment of moneys shall be subject to all proper set-offs in favor of the Department and to all deductions provided for in the contract and particularly all money withheld, whether assigned or not, shall be subject to being used by the Department for the completion of the work in the event that the Contractor should be in default therein.

6-1.03 BEGINNING OF WORK

- The Contractor shall begin work within 15 calendar days after receiving notice that the contract has been approved by the Attorney General or the attorney appointed and authorized to represent the Department, and shall diligently prosecute the same to completion within the time limit provided in the special provisions.
- The Contractor shall notify the Engineer, in writing, of the Contractor's intent to begin work at least 72 hours before work is begun. The notice shall be delivered to the Office of the District Director of Transportation in the district in which the work is situated and shall specify the date the Contractor intends to start. If the project has more than one location of work, a separate notice shall be given for each location.
- Should the Contractor begin work in advance of receiving notice that the contract has been approved as above provided, any work performed by the Contractor in advance of the date of approval shall be considered as having been done by the Contractor at the Contractor's own risk and as a volunteer unless the contract is approved.
- The delivery to the State for execution and approval of the contract properly executed on behalf of the Contractor and surety and the minimum 72 hours advance written notice as required above shall constitute the Contractor's authority to enter upon the site of the work and to begin operations, subject to the Contractor's assumption of the risk of the disapproval of the contract, as above provided, and subject also to the following:

(1) The Contractor shall, on commencing operations, take all precautions required for public safety and shall observe all the provisions in these General Conditions and the special provisions.
(2) In the event of disapproval, the Contractor shall at the Contractor's expense do that work that is necessary to leave the site in a neat condition to the satisfaction of the Engineer.

(3) All work done according to the contract prior to its approval, will, when the contract is approved, be considered authorized work and will be paid for as provided in the contract.

(4) The Contractor shall not be entitled to any additional compensation or an extension of time for any delay, hindrance or interference caused by or attributable to commencement of work prior to the date on which the contract was approved by the Attorney General or the attorney appointed and authorized to represent the Department, except to the extent the delay, hindrance or interference would have been compensable hereunder had work been commenced on the date of the approval and the progress thereof been the same as that actually made.

6-1.04 PROGRESS SCHEDULE

- The Contractor shall submit to the Engineer a practicable progress schedule within 15 days of approval of the contract, and within 7 days of the Engineer's written request at any other time.
- The Contractor may furnish the schedule on a form of the Contractor's choice or, if requested, the Engineer will furnish a form for the Contractor's use. If the Engineer furnishes a form, the Engineer will also furnish to the Contractor, on request, on or before the last day of each month a copy of the form showing the status of work actually completed during the preceding estimate period.
- The schedule shall show the order in which the Contractor proposes to carry out the work, the dates on which the Contractor will start the several salient features of the work, and the contemplated dates for completing those salient features.
- The progress schedules submitted shall be consistent in all respects with the time and order of work requirements of the contract.
- Subsequent to the time that submittal of a progress schedule is required in conformance with these General Conditions, no progress payment will be made for any work until a satisfactory schedule has been submitted to the Engineer.

6-1.05 SCHEDULE OF VALUES

- The Contractor shall submit to the Engineer a schedule of values for each lump sum item. The sum of the items listed in the schedule of values shall equal the contract lump sum prices. Overhead and profit shall not be listed as separate items. The schedule of values shall be approved by the Engineer before any partial payment estimate is prepared.

6-1.06 TEMPORARY SUSPENSION OF WORK

- The Engineer shall have the authority to suspend the work wholly or in part, for any time period as the Engineer deems necessary, due to unsuitable weather, or to such other conditions as are considered unfavorable for the suitable prosecution of the work, or for any time period as the Engineer deems necessary due to the failure on the part of the Contractor to carry out orders given, or to perform any provision of the contract.
- The Contractor shall immediately comply with the written order of the Engineer to suspend the work wholly or in part. The suspended work shall be resumed when conditions are favorable and methods are corrected, as ordered or approved in writing by the Engineer.
- If the Engineer orders a suspension of all of the work or a portion of the work which is the current controlling operation or operations, due to unsuitable weather or to such other conditions as are considered unfavorable to the suitable prosecution of the work, the days on which the suspension is in effect shall not be considered working days as defined in Section 6-1.07," Time of Completion," of these General Conditions. If a portion of work at the time of the suspension is not a current controlling operation or operations, but subsequently does become the current controlling operation or operations, the determination of working days will be made on the basis of the then current controlling operation or operations.
- If a suspension of work is ordered by the Engineer, due to the failure on the part of the Contractor to carry out orders given or to perform any provision of the contract, the days on which the suspension order is in effect shall be considered working days if those days are working days within the meaning of the definition set forth in Section 6-1.07," Time of Completion," of these General Conditions.
- In the event of a suspension of work under any of the conditions set forth in this Section 6-1.06, the suspension of work shall not relieve the Contractor of the Contractor's legal responsibilities as set forth in these General Conditions.
- The Contractor shall have no claim for damage or compensation for any delay, interference or hindrance resulting from an ordered temporary suspension of the work.
- In addition to the requirements specified above, the following shall apply:

If the performance of all or any portion of the work is suspended or delayed by the Engineer in writing for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry) and the Contractor believes that additional compensation or contract time or additional compensation and contract time is due as a result of the suspension or delay, the Contractor shall submit to the Engineer in writing a request for adjustment within 7 calendar days of receipt of the notice to resume work. The request shall set forth the reasons and support for the adjustment.

Upon receipt, the Engineer will evaluate the Contractor's request. If the Engineer agrees that the cost or time or cost and time required for the performance of the contract has increased as a result of the suspension and the suspension was caused by conditions beyond the control of and not the fault of the Contractor, the Contractor's suppliers, or subcontractors at any approved tier, and not caused by weather, the Engineer will make an adjustment (excluding profit) and modify the contract in writing accordingly. The Engineer will notify the Contractor of the Engineer's determination whether or not an adjustment of the contract is warranted.

No contract adjustment will be allowed unless the Contractor has submitted the request for adjustment within the time prescribed.

No contract adjustment will be allowed under the provisions specified in this section to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided for or excluded under any term or condition of this contract.

6-1.07 TIME OF COMPLETION

- The Contractor shall complete all or any designated portion of the work called for under the contract in all parts and requirements within the time set forth in the special provisions.
- A working day is defined as any day, except Saturdays, Sundays and legal holidays and days on which the Contractor is specifically required by the special provisions to suspend construction operations, and except days on which the Contractor is prevented by inclement weather or conditions resulting immediately therefrom adverse to the current controlling operation or operations, as determined by the Engineer, from proceeding with at least 75 percent of the normal labor and equipment force engaged on the controlling operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations.
- Should the Contractor prepare to begin work at the regular starting time in the morning of any day on which inclement weather, or the conditions resulting from the weather, or the condition of the work, prevents the work from beginning at the usual starting time and the crew is dismissed as a result thereof and the Contractor does not proceed with at least 75 percent of the normal labor and equipment force engaged in the current controlling operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations, the Contractor will not be charged for a working day whether or not conditions should change thereafter during that day and the major portion of the day could be considered to be suitable for those construction operations.
- The current controlling operation or operations is to be construed to include any feature of the work which, if delayed, will delay the time of completion of the contract.
- Determination that a day is a nonworking day by reason of inclement weather or conditions resulting immediately therefrom shall be made and agreed upon during that day by conference between the Engineer and the Contractor. In the event of failure to agree, the Contractor will be allowed 15 days from the issuance of the weekly statement of working days in which to file a written protest setting forth in what respects the Contractor differs from the Engineer, otherwise the decision of the Engineer shall be deemed to have been accepted by the Contractor as correct. The Engineer will furnish the Contractor a weekly statement showing the number of working days charged to the contract for the preceding week, the number of working days of time extensions being considered or approved, the number of working days originally specified for the completion of the contract and the number of working days remaining to complete the contract and the extended date for completion thereof, except when working days are not being charged in conformance with the provisions in Section 6-1.06, "Temporary Suspension of Work," of these General Conditions.

6-1.08 LIQUIDATED DAMAGES

- It is agreed by the parties to the contract that in case all the work called for under the contract in all parts and requirements is not finished or completed within the number of working days as set forth in the special provisions, damage will be sustained by the State of California, and that it is and will be impracticable and extremely difficult to ascertain and determine the actual damage which the State will sustain in the event of and by reason of the delay; and it is therefore agreed that the Contractor will pay to the State of California, the sum set forth in the special provisions per day for each and every calendar day's delay in finishing the work in excess of the number of working days prescribed; and the Contractor agrees to pay the liquidated damages herein provided for, and further agrees that the Department may deduct the amount thereof from any moneys due or that may become due the Contractor under the contract.

- It is further agreed that in case the work called for under the contract is not finished and completed in all parts and requirements within the number of working days specified, the Director shall have the right to increase the number of working days or not, as the Director may deem best to serve the interest of the State, and if the Director decides to increase the number of working days, the Director shall further have the right to charge to the Contractor, the Contractor's heirs, assigns or sureties and to deduct from the final payment for the work all or any part, as the Director may deem proper, of the actual cost of engineering, inspection, superintendence, and other overhead expenses which are directly chargeable to the contract, and which accrue during the period of the extension, except that cost of final surveys and preparation of final statement shall not be included in the charges.
- The Contractor will be granted an extension of time and will not be assessed with liquidated damages or the cost of engineering and inspection for any portion of the delay in completion of the work beyond the time named in the special provisions for the completion of the work caused by acts of God or of the public enemy, fire, floods, tsunamis, earthquakes, epidemics, quarantine restrictions, strikes, labor disputes, shortage of materials and freight embargoes, provided, that the Contractor shall notify the Engineer in writing of the causes of delay within 15 days from the beginning of that delay. The Engineer shall ascertain the facts and the extent of the delay, and the Engineer's findings thereon shall be final and conclusive.
- No extension of time will be granted for a delay caused by a shortage of materials unless the Contractor furnishes to the Engineer documentary proof that the Contractor has made every effort to obtain the materials from all known sources within reasonable reach of the work in a diligent and timely manner, and further proof in the form of supplementary progress schedules, as required in Section 6-1.04, "Progress Schedule," of these General Conditions that the inability to obtain the materials when originally planned, did in fact cause a delay in final completion of the entire work which could not be compensated for by revising the sequence of the Contractor's operations. The term "shortage of materials," as used in this section, shall apply only to materials, articles, parts or equipment which are standard items and are to be incorporated in the work. The term "shortage of materials," shall not apply to materials, parts, articles, or equipment which are processed, made, constructed, fabricated or manufactured to meet the specific requirements of the contract. Only the physical shortage of material will be considered under these provisions as a cause for extension of time. Delays in obtaining materials due to priority in filling orders will not constitute a shortage of materials.
- If the Contractor is delayed in completion of the work by reason of changes made under Section 3, "Changes in the Work," of these General Conditions or by any act of the Engineer or of the Department, not contemplated by the contract, an extension of time commensurate with the delay in completion of the work thus caused will be granted and the Contractor shall be relieved from any claim for liquidated damages, or engineering and inspection charges or other penalties for the period covered by that extension of time; provided that the Contractor shall notify the Engineer in writing of the causes of delay within 15 days from the beginning of the delay. The Engineer shall ascertain the facts and the extent of the delay, and the Engineer's findings thereon shall be final and conclusive.
- Except as provided in Public Contract Code Section 7102, the Contractor shall have no claim for damage or compensation for any delay or hindrance whether or not contemplated by the contract.
- It is the intention of the above provisions that the Contractor shall not be relieved of liability for liquidated damages or engineering and inspection charges for any period of delay in completion of the work in excess of that expressly provided for in this Section 6-1.08.

6-1.09 TERMINATION

6-1.09A Termination Of Contract - "Convenience Of State"

- The Department reserves the right to terminate the contract at any time if the Director determines that to do so would be in the best interest of the State.
- Termination of the contract and the total compensation payable to the Contractor in the event of termination shall be governed by the following:

(1) The Engineer will issue the Contractor a written notice signed by the Director, specifying that the contract is to be terminated. Upon receipt of that written notice and, except as otherwise directed in writing by the Engineer, the Contractor shall:

(a) Stop all work under the contract except that specifically directed to be completed prior to acceptance.
(b) Perform work the Engineer deems necessary to secure the project for termination.
(c) Remove equipment from the site of the work.
(d) Take the required action as is necessary to protect materials from damage.

(e) Notify all subcontractors and suppliers that the contract is being terminated and that their contracts or orders are not to be further performed unless otherwise authorized in writing by the Engineer.
(f) Provide the Engineer with an inventory list of all materials previously produced, purchased or ordered from suppliers for use in the work and not yet used in the work, including its storage location, and any other information as the Engineer may request.
(g) Dispose of materials not yet used in the work as directed by the Engineer. It shall be the Contractor's responsibility to provide the State with good title to all materials purchased by the State hereunder, including materials for which partial payment has been made as provided in Section 7-1.05, "Partial Payments," of these General Conditions and with bills of sale or other documents of title for the materials.
(h) Subject to the prior written approval of the Engineer, settle all outstanding liabilities and all claims arising out of subcontracts or orders for materials terminated hereunder. To the extent directed by the Engineer, the Contractor shall assign to the Department all the right, title and interest of the Contractor under subcontracts or orders for materials terminated hereunder.
(i) Furnish the Engineer with the documentation required to be furnished by the Contractor under the provisions of the contract including, on projects as to which Federal funds are involved, all documentation required under the Federal requirements included in the contract.
(j) Take other actions as the Engineer may direct.

(2) Acceptance of the contract as hereinafter specified shall not relieve the Contractor of responsibility for damage to materials except as follows:

The Contractor's responsibility for damage to materials for which partial payment has been made as provided in Section 7-1.05, "Partial Payments," of these General Conditions and for materials furnished by the State for use in the work and unused shall terminate when the Engineer certifies that the materials have been stored in the manner and at the locations the Engineer has directed.

The Contractor's responsibility for damage to materials purchased by the State subsequent to the issuance of the notice that the contract is to be terminated shall terminate when title and delivery of those materials has been taken by the State.

When the Engineer determines that the Contractor has completed the work under the contract directed to be completed prior to termination and all other work as may have been ordered to secure the project for termination, the Engineer will recommend that the Director formally accept the contract, and immediately upon and after the acceptance by the Director, the Contractor will not be required to perform any further work thereon and shall be relieved of contractual responsibilities for injury to persons or damage to property which occurs after the formal acceptance of the project by the Director.

(3) The total compensation to be paid to the Contractor shall be determined by the Engineer on the basis of the following:

(a) The reasonable cost to the Contractor, without profit, for all work performed under the contract, including mobilization, demobilization and work done to secure the project for termination.
When in the opinion of the Engineer the cost of the work is excessively high due to costs incurred to remedy or replace defective or rejected work, the reasonable cost to be allowed will be the estimated reasonable cost of performing that work in compliance with the requirements of the plans and special provisions and the excessive actual cost shall be disallowed.
(b) A reasonable allowance for profit on the cost of work performed as determined under Subsection (a), provided the Contractor establishes to the satisfaction of the Engineer that it is reasonably probable that the Contractor would have made a profit had the contract been completed and provided further, that the profit allowed shall in no event exceed 4 percent of the cost.
(c) The reasonable cost to the Contractor of handling material returned to the vendor, delivered to the Department or otherwise disposed of as directed by the Engineer.
(d) A reasonable allowance for the Contractor's administrative costs in determining the amount payable due to termination of the contract.

All records of the Contractor and subcontractors, necessary to determine compensation in conformance with the provisions of this Section shall be open to inspection or audit by representatives of the Department at all times after issuance of the notice that the contract is to be terminated and for a period of 3 years, and these records shall be retained for that period.

After acceptance of the work by the Director, the Engineer may make payments on the basis of interim estimates pending issuance of the Final Statement, when in the Engineer's opinion the amount thus paid, together with all amounts previously paid or allowed, will not result in total compensation in excess of that to which the Contractor will be entitled. All payments, including payment upon the Final Statement, shall be subject to deduction for prior payments and amounts, if any, to be kept or retained under the provisions of the contract.

- The provisions of this Section shall be included in all subcontracts.

6-1.09B Termination Of Control - "Default Of Contractor"

- Failure to supply an adequate working force, or material of proper quality, or failure to comply with Section 10262 of the State Contract Act, or in any other respect to prosecute the work with the diligence and force specified by the contract, is grounds for termination of the Contractor's control over the work and for taking over the work by the State. The procedures for termination, completion of the work, and the rights and obligations of the parties are provided for in the State Contract Act (Public Contract Code Sections 10253-10260).
- If the Contractor's control of the work is terminated or the Contractor abandons the work and the contract work is completed in conformance with the provisions in Section 10255 of the State Contract Act, any dispute concerning the amount to be paid by the State to the Contractor or the Contractor's surety or to be paid to the State by the Contractor or the Contractor's surety, under the provisions in Section 10258 of the State Contract Act, shall be subject to arbitration in conformance with the provisions in Section 7-1.10, "Arbitration," of these General Conditions. The surety shall be bound by the arbitration award and is entitled to participate in the arbitration proceedings.

SECTION 7

ACCEPTANCE AND PAYMENT

7-1.01 ACCEPTANCE

- The contract will be accepted in writing by the Director when the whole shall have been completed in all respects in conformance with the provisions of the contract to the full satisfaction of the Department.

7-1.02 SCOPE OF PAYMENT

- The Contractor shall accept the compensation provided in the contract as full payment for furnishing all labor, materials, tools, equipment, and incidentals necessary to the completed work and for performing all work contemplated and embraced under the contract; also for loss or damage arising from the nature of the work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the work until the acceptance by the Director and for all risks of every description connected with the prosecution of the work, also for all expenses incurred in consequence of the suspension or discontinuance of the work as provided in the contract; and for completing the work according to the contract. Neither the payment of any estimate nor of any retained percentage shall relieve the Contractor of any obligation to make good any defective work or material.
- No compensation will be made in any case for loss of anticipated profits.

7-1.03 NOTICE OF POTENTIAL CLAIM

- The Contractor shall not be entitled to the payment of any additional compensation for any act, or failure to act, by the Engineer, including failure or refusal to issue a change order, or for the happening of any event, thing, occurrence, or other cause, unless the Contractor shall have given the Engineer due written notice of potential claim as hereinafter specified. Compliance with this Section 7-1.03 shall not be a prerequisite as to matters within the scope of the protest provisions in Section 3, "Changes in the Work," or Section 6-1.07, "Time of Completion," or the notice provisions in Section 2-1.045, "Differing Site Conditions," or Section 6-1.08, "Liquidated Damages," or Section 5-1.06, "Responsibility for Utilities," of these General Conditions.
- The written notice of potential claim shall be submitted to the Engineer prior to the time that the Contractor performs the work giving rise to the potential claim for additional compensation, if based on an act or failure to act by the Engineer, or in all other cases within 15 days after the happening of the event, thing, occurrence, or other cause, giving rise to the potential claim.
- The written notice of potential claim shall be submitted on Form CEM-6201 furnished by the Department and shall be certified with reference to the California False Claims Act, Government Code Sections 12650 - 12655. The notice shall set forth the reasons for which the Contractor believes additional compensation will or may be due and the nature of the costs involved. Unless the amount of the potential claim has been stated in the written notice, the Contractor shall, within 15 days of submitting the notice, furnish an estimate of the cost of the affected work and impacts, if any, on project completion. The estimate of costs may be changed or updated by the Contractor when conditions have changed. When the affected work is completed, the Contractor shall submit substantiation of the Contractor's actual costs. Failure to do so shall be sufficient cause for denial of any claim subsequently filed on the basis of that notice of potential claim.
- It is the intention of this Section 7-1.03 that differences between the parties arising under and by virtue of the contract be brought to the attention of the Engineer at the earliest possible time in order that those matters may be settled, if possible, or other appropriate action promptly taken. The Contractor hereby agrees that the Contractor shall have no right to additional compensation for any claim that may be based on any act, failure to act, event, thing or occurrence for which no written notice of potential claim as herein required was filed.
- Should the Contractor, in connection with or subsequent to the assertion of a potential claim, request inspection and copying of documents or records in the possession of the Department that pertain to the potential claim, the Contractor's records of the project, as deemed by the Department to be pertinent to the potential claim, shall be made available to the Department for inspection and copying.

7-1.04 STOP NOTICES

- The State of California, by and through the Department or other appropriate State office or officers, may at its option and at any time retain out of any amounts due the Contractor, sums sufficient to cover claims, filed pursuant to Section 3179 et seq of the Civil Code.
- Stop notice information may be obtained from the Departmental Disbursing Office at 1801 30th Street, East Building, Sacramento, California.

7-1.05 PARTIAL PAYMENTS

- The Department, once in each month upon request of the Contractor for partial payments, shall cause an estimate in writing to be made by the Engineer. The estimate shall include the total amount of work done and acceptable materials furnished to the time of the estimate, and the value thereof. The acceptable materials shall include materials that are furnished and delivered to the work site and are not incorporated in the work.
- The Department shall retain 10 percent of the estimated value of the work done and 10 percent of the value of materials so estimated to have been furnished and delivered and not incorporated in the work as aforesaid as part security for the fulfillment of the contract by the Contractor, except that at any time after 20 percent of the work has been completed, if the Engineer finds that satisfactory progress is being made, the Department may reduce the total amount being retained from payment pursuant to the above requirements to 5 percent of the total estimated value of the work and materials and may also reduce the amount retained from any of the remaining partial payments to 5 percent of the estimated value of the work and materials. In addition, on any partial payment made after 95 percent of the work has been completed, the Department may reduce the amount withheld from payment pursuant to the requirements of this Section 7-1.05, to such lesser amount as the Department determines is adequate security for the fulfillment of the balance of the work and other requirements of the contract, but in no event will that amount be reduced to less than 125 percent of the estimated value of the work yet to be completed as determined by the Engineer. The reduction will only be made upon the written request of the Contractor and shall be approved in writing by the surety on the Performance Bond and by the surety on the Payment Bond. The approval of the surety shall be submitted to the Disbursing Officer of the Department; the signature of the person executing the approval for the surety shall be properly acknowledged and the power of attorney authorizing the person to give that consent must either accompany the document or be on file with the Department.
- The Department shall pay monthly to the Contractor, while carrying on the work, the balance not retained, as aforesaid, after deducting therefrom all previous payments and all sums to be kept or retained under the provisions of the contract. No monthly estimate or payment shall be required to be made when, in the judgment of the Engineer, the work is not proceeding in conformance with the provisions of the contract.
- No monthly estimate or payment shall be construed to be an acceptance of any defective work or improper materials.
- Attention is directed to the prohibitions and penalties pertaining to unlicensed contractors as provided in Business and Professions Code Sections 7028.15(a) and 7031.

7-1.06 PAYMENT OF WITHHELD FUNDS

- Attention is directed to Section 7-1.05, "Partial Payments," of these General Conditions and in particular to the retention provisions of Section 7-1.05, of these General Conditions.
- Upon the Contractor's request, pursuant to Public Contract Code Section 10263, the Department will make payment of funds withheld from progress payments to ensure performance of the contract if the Contractor deposits in escrow with the State Treasurer, or with a bank acceptable to the Department, securities equivalent to the amount withheld. The Contractor shall be beneficial owner of any securities substituted for moneys withheld and shall receive any interest thereon. Upon satisfactory completion of the contract, the securities shall be returned to the Contractor.
- Alternatively, upon the Contractor's request, the Department will make payment of retentions earned directly to the escrow agent. The Contractor may direct the investment of the payments into securities and the Contractor shall receive the interest earned on the investments upon the same terms provided for securities deposited by the Contractor. Upon satisfactory completion of the contract, the Contractor shall receive from the escrow agent all securities, interest, and payments received by the escrow agent from the Department, pursuant to the terms in Section 10263 of the Public Contract Code.
- Alternatively, and subject to the approval of the Department, the payment of retentions earned may be deposited directly with a person licensed under Division 6 (commencing with Section 17000) of the Financial Code as the escrow agent. Upon written request of an escrow agent that has not been approved by the Department under subdivision (c) of Section 10263 of the Public Contract Code, the Department will provide written notice to that escrow agent within 10 business days of receipt of the request indicating the reason or reasons for not approving that escrow agent. The payments will be deposited in a trust account with a Federally chartered bank or savings association within 24 hours of receipt by the escrow agent. The Contractor shall not place any retentions with the escrow agent in excess of the coverage provided to that escrow agent pursuant to subdivision (b) of Section 17314 of the Financial Code. In all respects not inconsistent with subdivision (c) of Section 10263 of the Public Contract Code, the remaining provisions of Section 10263 of the Public Contract Code shall apply to escrow agents acting pursuant to subdivision (c) of Section 10263 of the Public Contract Code.
- Securities eligible for investment shall include those listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and the Department.

- The escrow agreement used pursuant to this Section 7-1.06 shall be substantially similar to the "Escrow Agreement for Security Deposits In Lieu of Retention" in Section 10263 of the Public Contract Code, deemed as incorporated herein by reference.
- The Contractor shall obtain the written consent of the surety to the agreement.

7-1.07 FINAL PAYMENT AND CLAIMS

- After acceptance of the work by the Director, the Department will make a final monthly payment pending approval of the final statement. The final monthly payment will be the balance found to be due after deduction of all previous payments, all amounts to be kept or retained under the provisions of the contract, and such further amounts as the Engineer determined to be necessary pending approval of the final statement. The Engineer will promptly submit to the Contractor a final statement of the sum due the Contractor under the contract. The statement shall take into account the contract price, as adjusted by any change order; amounts already paid; and sums to be withheld for incomplete work, liquidated damages, and for any other cause under the contract. The Contractor shall submit written approval of the final statement or submit a written statement of all claims arising under or by virtue of the contract so that the Engineer receives the written approval or statement of claims no later than close of business of the thirtieth day after receiving the final statement of the sum due the Contractor. If the thirtieth day falls on a Saturday, Sunday or legal holiday, then receipt of the written approval or statement of claims by the Engineer shall not be later than the close of business of the next business day. The approval of that statement or the failure to file a claim within the specified 30 day period shall constitute a waiver by the Contractor of any additional right to compensation under or by reason of the contract and the payment so made by the State shall thereupon become a complete statement between the State and the Contractor.
- To constitute the filing of a claim, the Contractor shall set forth in writing the basis for the claim and the amount of money for which demand is made and shall submit the same to the Engineer. No demand by the Contractor shall be recognized as a claim by the State unless it is filed in conformance with this paragraph.
- Claims filed by the Contractor shall be in sufficient detail to enable the Engineer to ascertain the basis and amount of those claims. If additional information or details are required by the Engineer to determine the basis and amount of the claims, the Contractor shall furnish additional information or details so that the information or details are received by the Engineer no later than the fifteenth day after receipt of the written request from the Engineer. If the fifteenth day falls on a Saturday, Sunday or legal holiday, then receipt of the information or details by the Engineer shall not be later than close of business of the next business day. Failure to submit the information and details to the Engineer within the time specified will be sufficient cause for denying the claim.
- The Contractor shall keep full and complete records of the costs and additional time incurred for any work for which a claim for additional compensation is made. The Engineer or any designated claim investigator or auditor shall have access to those records and any other records as may be required by the Engineer to determine the facts or contentions involved in the claims. Failure to permit access to those records shall be sufficient cause for denying the claims.

- Claims submitted by the Contractor shall be accompanied by a notarized certificate containing the following language:

Under the penalty of law for perjury or falsification and with specific reference to the California False Claims Act, Government Code Section 12650 et. seq., the undersigned,

_____,
(name)
_____ of
(title)
_____,
(company)

hereby certifies that the claim for the additional compensation and time, if any, made herein for the work on this contract is a true statement of the actual costs incurred and time sought, and is fully documented and supported under the contract between parties.

Dated _____

/s/ _____

Subscribed and sworn before me this _____ day

of _____.

_____
Notary Public
My Commission Expires _____

- Failure to submit the notarized certificate will be sufficient cause for denying the claim.
- Any claim for overhead type expenses or costs, in addition to being certified as stated above, shall be supported by an audit report of an independent Certified Public Accountant. Any claim for overhead shall also be subject to audit by the State at its discretion.
- Any costs or expenses incurred by the State in reviewing or auditing any claims that are not supported by the Contractor's cost accounting or other records shall be deemed to be damages incurred by the State within the meaning of the California False Claims Act.
- The District Director of the District which administers the contract will make the final determination of any claims which remain in dispute after completion of claim review by the Engineer. A board or person designated by the District Director will review those claims and make a written recommendation thereon to the District Director. The Contractor may meet with the review board or person to make a presentation in support of those claims.
- Upon final determination of the claims, the Engineer will then make and issue the Engineer's final statement in writing and within 30 days thereafter the State will pay the entire sum, if any, found due thereon. That final statement shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor, except as otherwise provided in Section 7-1.08, "Clerical Errors," of these General Conditions.

7-1.08 CLERICAL ERRORS

- Notwithstanding the provisions in Section 7-1.07, "Final Payment And Claims," of these General Conditions, for a period of 3 years after acceptance of the work, all estimates and payments made pursuant to Section 7-1.07, including the final statement and payment, shall be subject to correction and adjustment for clerical errors in the calculations involved in the determination of quantities and payments. The Contractor and the Department agree to pay to the other any sum due under the provisions of this Section 7-1.08, provided, however, if the total sum to be paid is less than $200, no payment shall be made.

7-1.09 GUARANTEE

The Contractor hereby unconditionally guarantees that the mechanical and electrical equipment and related components in the building work will be done in conformance with the requirements of the contract, and further guarantees the same to be and remain free of defects in workmanship and materials for a period of 6 months from the date of acceptance of the contract. The Contractor hereby agrees to repair or replace any and all mechanical and electrical equipment and related components in the building work that may prove to be not in conformance with the requirements of the contract or that may be defective in its workmanship or material within the guarantee period specified, without any expense whatsoever to the Department, ordinary wear and tear and unusual abuse or neglect excepted.

A portion of the performance bond for the contract in a sum equal to one half the value of the mechanical and electrical equipment and related components in the building work, shall remain in full force and effect during the guarantee period. The value of those mechanical and electrical equipment and related components shall be the value determined in conformance with the requirements specified in Section 6-1.05, "Schedule of Values" of the General Conditions.

The Contractor further agrees that, within 10 calendar days after being notified in writing by the Department of any mechanical and electrical equipment and related components in the building work not in conformance with the requirements of the contract or any defects in the mechanical and electrical equipment and related components in the building work, he shall commence and prosecute with due diligence all work necessary to fulfill the terms of this guarantee, and shall complete the work within a reasonable period of time, and, in the event the Contractor fails to comply, he does hereby authorize the Department to proceed to have such work done at the Contractor's expense and he shall honor and pay the cost and charges therefor upon demand. The Department shall be entitled to all costs and expenses, including reasonable attorney's fees, necessarily incurred upon the Contractor's refusal to honor and pay the above costs and charges.

7-1.10 ARBITRATION

Sections 10240-10240.13, inclusive of the Public Contract Code provides for the resolution of contract claims by arbitration.

Claims (demands for monetary compensation or damages) arising under or related to performance of the contract shall be resolved by arbitration unless the Department and the Contractor agree in writing, after the claim has arisen, to waive arbitration and to have the claim litigated in a court of competent jurisdiction. Arbitration shall be pursuant to Public Contract Code Sections 10240-10240.13, inclusive, and applicable regulations (see Subchapter 3 [Sections 301-382, inclusive] of Chapter 2 of Title 1 of the California Code of Regulations). The arbitration decision shall be decided under and in conformance with the law of this State, supported by substantial evidence and, in writing, contain the basis for the decision, findings of fact, and conclusions of law.

Arbitration shall be initiated by a Complaint in Arbitration made in compliance with the requirements of those regulations. A Complaint in Arbitration by the Contractor shall be made not later than 90 days after the date of service in person or by mail on the Contractor of the final written decision by the Department on the claim.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISIONS

Annexed to Contract No. 08-479504

DIVISION 0 BIDDING AND CONTRACT REQUIREMENTS

0.01 INSTRUCTIONS TO BIDDERS AND GENERAL CONDITIONS

The work embraced herein shall conform to the provisions in the Instructions to Bidders and General Conditions for Building Construction of the Department of Transportation, dated January, 2002, a single publication attached hereto and referred to herein as "Instructions to Bidders" and "General Conditions", and the following special provisions.

In case of conflict between the Instructions to Bidders or the General Conditions and these special provisions, the special provisions shall take precedence over and be used in lieu of the conflicting portions.

0.02 PROPOSAL REQUIREMENTS AND CONDITIONS

The bidder's attention is directed to the provisions in Section 1, "Proposal Requirements and Conditions," of the Instructions to Bidders, and these special provisions for the requirements and conditions which the bidder must observe in the preparation of the proposal form and the submission of the bid.

The Bidder's Bond form mentioned in the last paragraph in Section 1-1.07, "Proposal Guaranty," of the Instructions to Bidders will be found following the signature page of the Proposal.

In conformance with Public Contract Code Section 7106, a Noncollusion Affidavit is included in the Proposal. Signing the Proposal shall also constitute signature of the Noncollusion Affidavit.

Failure of the bidder to fulfill the requirements of the Special Provisions for submittals required to be furnished after bid opening, including but not limited to DBE or DVBE submittals, or escrowed bid documents, where applicable, may subject the bidder to a determination of the bidder's responsibility in the event it is the apparent low bidder on a future public works contracts.

0.024 DISABLED VETERAN BUSINESS ENTERPRISE (DVBE)

Section 10115 of the Public Contract Code requires the Department to implement provisions to establish goals for Disabled Veteran Business Enterprise (DVBE) in contracts.

It is the policy of the Department that disabled veteran business enterprises (DVBEs) shall be encouraged to participate in the performance of contracts financed solely with state funds. The Contractor should ensure that DVBEs have the opportunity to participate in the performance of this contract and shall take all necessary and reasonable steps for this assurance. The Contractor shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of subcontracts. Failure to carry out the requirements of this paragraph shall constitute a breach of contract and may result in termination of this contract or other remedy the Department may deem appropriate.

Bidder's attention is directed to the following:

A. "Disabled Veteran Business Enterprise" (DVBE) means a business concern certified as a DVBE by the , Office of Small Business and Disabled Veteran Business Enterprise Certification, Department of General Services.

Bidders are urged to obtain DVBE participation in this project, although there is no specific project goal for DVBE participation. After completion of the project, if DVBE participation is obtained, the Contractor shall furnish the Engineer with the names of DVBEs participating, with a complete description and the dollar value of work or supplies provided by each DVBE transaction.

The Office of Small Business and Disabled Veteran Business Enterprise Certification, Department of General Services, may be contacted at (800) 559-5529 or (916) 375-4940 or visit their internet web site at http://www.pd.dgs.ca.gov/smbus/default.htm for program information and certification status. The Department's Business Enterprise Program may also be contacted through their internet web site at http://www.dot.ca.gov/hq/bep/ or at (866) 810-6346 or (916) 324-1700.

0.027 SMALL BUSINESS PREFERENCE

Attention is directed to "Award and Execution of Contract" of these special provisions.

Attention is also directed to the Small Business Procurement and Contract Act, Government Code Section 14835, et seq and Title 2, California Code of Regulations, Section 1896, et seq.

Bidders who wish to be classified as a Small Business under the provisions of those laws and regulations, shall be certified as Small Business by the Department of General Services, Office of Small Business and Disabled Veteran Business Enterprise Certification, 707 Third Street, West Sacramento, CA 95605.

To request Small Business Preference, bidders shall fill out and sign the Request for Small Business Preference form in the Proposal and shall attach a copy of their Office of Small Business and Disabled Veteran Business Enterprise Certification (OSDC) small business certification letter to the form. The bidder's signature on the Request for Small Business Preference certifies, under penalty of perjury, that the bidder is certified as Small Business at the time of bid opening and further certifies, under penalty of perjury, that under the following conditions, at least 50 percent of the subcontractors to be utilized on the project are either certified Small Business or have applied for Small Business certification by bid opening date and are subsequently granted Small Business certification.

The conditions requiring the aforementioned 50 percent level of subcontracting by Small Business subcontractors apply if:

A. The lowest responsible bid for the project exceeds $100,000; and
B. The project work to be performed requires a Class A or a Class B contractor's license; and
C. Two or more subcontractors will be used.

If the above conditions apply and Small Business Preference is granted in the award of the contract, the 50 percent Small Business subcontractor utilization level shall be maintained throughout the life of the contract.

0.028 CALIFORNIA COMPANY PREFERENCE

Attention is directed to "Award and Execution of Contract" of these special provisions.

In conformance with the requirements of Section 6107 of the Public Contract Code, a "California company" will be granted a reciprocal preference for bid comparison purposes as against a nonresident contractor from any state that gives or requires a preference to be given contractors from that state on its public entity construction contracts.

A "California company" means a sole proprietorship, partnership, joint venture, corporation, or other business entity that was a licensed California contractor on the date when bids for the public contract were opened and meets one of the following:

A. Has its principal place of business in California.
B. Has its principal place of business in a state in which there is no local contractor preference on construction contracts.
C. Has its principal place of business in a state in which there is a local contractor construction preference and the contractor has paid not less than $5000 in sales or use taxes to California for construction related activity for each of the five years immediately preceding the submission of the bid.

To carry out the "California company" reciprocal preference requirements of Section 6107 of the Public Contract Code, all bidders shall fill out and sign the California Company Preference form in the Proposal. The bidder's signature on the California Company Preference form certifies, under penalty of perjury, that the bidder is or is not a "California company" and if not, the amount of the preference applied by the state of the nonresident Contractor.

A nonresident Contractor shall disclose any and all bid preferences provided to the nonresident Contractor by the state or country in which the nonresident Contractor has its principal place of business.

Proposals without the California Company Preference form filled out and signed may be rejected.

0.03 AWARD AND EXECUTION OF CONTRACT

The bidder's attention is directed to the provisions in Section 2, "Award and Execution of Contract," of the Instructions to Bidders and these special provisions for the requirements and conditions concerning award and execution of contract.

Bid protests are to be delivered to the following address: Department of Transportation, MS 43, Attn: Office Engineer, 1727 30th Street, Sacramento, CA 95816 or by facsimile to the Office Engineer at (916) 227-6282.

The contract shall be executed by the successful bidder and shall be returned, together with the contract bonds, to the Department so that it is received within 10 days, not including Saturdays, Sundays and legal holidays, after the bidder has received the contract for execution. Failure to do so shall be just cause for forfeiture of the proposal guaranty. The executed contract documents shall be delivered to the following address: Department of Transportation MS 43, Attn: Office Engineer, 1727 30th Street, Sacramento, CA 95816.

A "Payee Data Record" form will be included in the contract documents to be executed by the successful bidder. The purpose of the form is to facilitate the collection of taxpayer identification data. The form shall be completed and returned to the Department by the successful bidder with the executed contract and contract bonds. For the purposes of the form, payee shall be deemed to mean the successful bidder. The form is not to be completed for subcontractors or suppliers. Failure to complete and return the "Payee Data Record" form to the Department as provided herein will result in the retention of 20 percent of payments due the contractor and penalties of up to $20,000. This retention of payments for failure to complete the "Payee Data Record" form is in addition to any other retention of payments due the Contractor.

Attention is also directed to "Small Business Preference" of these special provisions. Any bidder who is certified as a Small Business by the Department of General Services, , Office of Small Business and Disabled Veteran Business Enterprise Certification will be allowed a preference in the award of this contract, if it be awarded, under the following conditions:

A. The apparent low bidder is not certified as a Small Business, or has not filled out and signed the Request for Small Business Preference included with the bid documents and attached a copy of their Office of Small Business and Disabled Veteran Business Enterprise Certification small business certification letter to the form; and
B. The bidder filled out and signed the Request for Small Business Preference form included with the bid documents and attached a copy of their , Office of Small Business and Disabled Veteran Business Enterprise Certification small business certification letter to the form.

The small business preference will be a reduction in the bid submitted by the small business contractor, for bid comparison purposes, by an amount equal to 5 percent of the amount bid by the apparent low bidder, the amount not to exceed $50,000. If this reduction results in the small business contractor becoming the low bidder, then the contract will be awarded to the small business contractor on the basis of the actual bid of the small business contractor notwithstanding the reduced bid price used for bid comparison purposes.

Attention is also directed to "California Company Preference" of these special provisions.

The amount of the California company reciprocal preference shall be equal to the amount of the preference applied by the state of the nonresident contractor with the lowest responsive bid, except where the "California company" is eligible for a California Small Business Preference, in which case the preference applied shall be the greater of the two, but not both.

If the bidder submitting the lowest responsive bid is not a "California company" and with the benefit of the reciprocal preference, a "California company's" responsive bid is equal to or less than the original lowest responsive bid, the "California company" will be awarded the contract at its submitted bid price except as provided below.

Small business bidders shall have precedence over nonsmall business bidders in that the application of the "California company" preference for which nonsmall business bidders may be eligible shall not result in the denial of the award to a small business bidder.

0.04 BEGINNING OF WORK, TIME OF COMPLETION AND LIQUIDATED DAMAGES

Attention is directed to the provisions in Section 6-1.03, "Beginning of Work," Section 6-1.07, "Time of Completion," and Section 6-1.08, "Liquidated Damages," of the General Conditions and these special provisions.

The Contractor shall begin work within 15 calendar days after the contract has been approved by the Attorney General or the attorney appointed and authorized to represent the Department of Transportation.

This work shall be diligently prosecuted to completion before the expiration of **110 WORKING DAYS** beginning on the fifteenth calendar day after approval of the contract.

The Contractor shall pay to the State of California the sum of $1000 per day, for each and every calendar day's delay in finishing the work in excess of **110 WORKING DAYS**.

0.051 ABBREVIATIONS

Attention is directed to the provisions in Section 1-1.26, "Abbreviations," of the General Conditions.

The following abbreviations are added:

CMC California Mechanical Code (2001 Edition)
CPC California Plumbing Code (2001 Edition)
NPCA National Precast Concrete Association

The following abbreviations are modified:

CBC California Building Code (2001 Edition)
CEC California Electrical Code (2001 Edition)
UBC Uniform Building Code (1997 Edition)

0.052 DIFFERING SITE CONDITIONS

Attention is directed to Section 2-1.045, "Differing Site Conditions," of the General Conditions.

During the progress of the work, if subsurface or latent conditions are encountered at the site differing materially from those indicated in the "Materials Information," log of test borings, other geotechnical data obtained by the Department's investigation of subsurface conditions, or an examination of the conditions above ground at the site, the party discovering those conditions shall promptly notify the other party in writing of the specific differing conditions before they are disturbed and before the affected work is performed.

The Contractor will be allowed 15 days from the notification of the Engineer's determination of whether or not an adjustment of the contract is warranted, in which to file a notice of potential claim in conformance with the provisions of Section 7-1.03, "Notice of Potential Claim," of the General Conditions and as specified herein; otherwise the decision of the Engineer shall be deemed to have been accepted by the Contractor as correct. The notice of potential claim shall set forth in what respects the Contractor's position differs from the Engineer's determination and provide any additional information obtained by the Contractor, including but not limited to additional geotechnical data. The notice of potential claim shall be accompanied by the Contractor's certification that the following were made in preparation of the bid: a review of the contract, a review of the "Materials Information," a review of the log of test borings and other records of geotechnical data to the extent they were made available to bidders prior to the opening of bids, and an examination of the conditions above ground at the site. Supplementary information, obtained by the Contractor subsequent to the filing of the notice of potential claim, shall be submitted to the Engineer in an expeditious manner.

0.053 INTEREST ON PAYMENTS

Interest shall be payable on progress payments, payments after acceptance, final statement, ordered changes in the work payments, and claim payments as follows:

A. Unpaid progress payments, payment after acceptance, and final statements shall begin to accrue interest 30 days after the Engineer prepares the payment estimate.
B. Unpaid ordered changes in work bills shall begin to accrue interest 30 days after preparation of the first pay estimate following receipt of a properly submitted and undisputed bill for ordered changes in the work. To be properly submitted, the bill must be submitted within 7 days of the performance of the ordered change in the work and in conformance with the provisions in Section 3, "Changes in the Work," and Section 7-1.05, "Partial Payments," of the General Conditions. An undisputed ordered change in the work bill not submitted within 7 days of performance of the ordered change in the work will begin to accrue interest 30 days after the preparation of the second pay estimate following submittal of the bill.
C. The rate of interest payable for unpaid progress payments, payments after acceptance, final payments, and ordered change in the work payments shall be 10 percent per annum.
D. The rate of interest payable on a claim, protest or dispute ultimately allowed under this contract shall be 6 percent per annum. Interest shall begin to accrue 61 days after the Contractor submits to the Engineer information in sufficient detail to enable the Engineer to ascertain the basis and amount of that claim, protest or dispute.

The rate of interest payable on any award in arbitration shall be 6 percent per annum if allowed under the provisions of Civil Code Section 3289.

0.054 FINAL PAYMENT AND CLAIMS

Attention is directed to Section 7-1.07, "Final Payment and Claims," of the General Conditions.

If the Contractor files a timely written statement of claims in response to the proposed final estimate, the District that administers the contract will submit a claim position letter to the Contractor by hand delivery or deposit in the U.S. mail within 135 days of acceptance of the contract. The claim position letter will delineate the District's position on the Contractor's claims. If the Contractor disagrees with the claim position letter, the Contractor shall submit a written notification of its disagreement to be received by the District not later than 15 days after the Contractor's receipt of the claim position letter. The written notification of disagreement shall set forth the basis for the Contractor's disagreement and be submitted to the office designated in the claim position letter. The Contractor's failure to provide a timely, written notification of disagreement shall constitute the Contractor's acceptance and agreement with the determinations provided in the claim position letter and with final payment pursuant to the claim position letter.

If the Contractor files a timely notification of disagreement with the District claim position letter, the board of review designated by the District Director to review claims that remain in dispute will meet with the Contractor within 45 days after receipt by the District of the notification of disagreement. Attendance by the Contractor at the board of review meeting shall be mandatory.

If the District fails to submit a claim position letter to the Contractor within 135 days after the acceptance of the contract and the Contractor has claims that remain in dispute, the Contractor may request a meeting with the board of review designated by the District Director to review claims that remain in dispute. The Contractor's request for a meeting shall identify the claims that remain in dispute. If the Contractor files a request for a meeting, the board of review will meet with the Contractor within 45 days after the District receives the request for the meeting. Attendance by the Contractor at the District Director's board of review meeting shall be mandatory.

Failure of the Contractor to file a timely written statement of claims in response to the proposed final estimate, or to file a timely notification of disagreement with the District claim position letter, or to attend the District Director's board of review meeting shall constitute a failure to pursue diligently and exhaust the administrative procedures in the contract and shall be a bar to arbitration in conformance with the requirements in Section 10240.2 of the California Public Contract Code.

0.055 REMOVAL OF ASBESTOS AND HAZARDOUS SUBSTANCES

When the presence of asbestos or hazardous substances are not shown on the plans or indicated in the specifications and the Contractor encounters materials which the Contractor reasonably believes to be asbestos or a hazardous substance as defined in Section 25914.1 of the Health and Safety Code, and the asbestos or hazardous substance has not been rendered harmless, the Contractor may continue work in unaffected areas reasonably believed to be safe. The Contractor shall immediately cease work in the affected area and report the condition to the Engineer in writing.

In conformance with Section 25914.1 of the Health and Safety Code, removal of asbestos or hazardous substances including exploratory work to identify and determine the extent of the asbestos or hazardous substance will be performed by separate contract.

If performance of the Contractor's current controlling operation is delayed in the area, and the delay could not be avoided by the judicious handling of forces, equipment, and plant, an extension of time determined in conformance with the provisions in Section 6-1.08, "Liquidated Damages," of the General Conditions will be granted. Compensation for the delay will be made only for the Contractor's actual losses due to idle time of equipment, necessary payments for idle time of workers, and cost of extra moving of equipment, in conformance with the provisions in Section 3-1.01E, "Allowable Costs for Changes," of the General Conditions, except that no markups will be added.

0.07 SUBCONTRACTOR AND DVBE RECORDS

The Contractor shall maintain records of all subcontracts entered into with certified DVBE subcontractors and records of materials purchased from certified DVBE suppliers. The records shall show the name and business address of each DVBE subcontractor or vendor and the total dollar amount actually paid each DVBE subcontractor or vendor.

Upon completion of the contract, a summary of these records shall be prepared on Form CEM-2402 (S) and certified correct by the Contractor or the Contractor's authorized representative, and shall be furnished to the Engineer.

0.077 SUBCONTRACTING

Attention is directed to the provisions in Section 6-1.01, "Subletting and Subcontracting," of the General Conditions and these special provisions.

Pursuant to the provisions in Section 1777.1 of the Labor Code, the Labor Commissioner publishes and distributes a list of contractors ineligible to perform work as a subcontractor on a public works project. This list of debarred contractors is available from the Department of Industrial Relations web site at:

http://www.dir.ca.gov/DLSE/Debar.html.

0.082 PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS

Attention is directed to the provisions in Sections 10262 and 10262.5 of the Public Contract Code and Section 7108.5 of the Business and Professions Code concerning prompt payment to subcontractors.

0.10 GUARANTEE

Section 7-1.09, "Guarantee," of the General Conditions is amended to read:

7-1.09 GUARANTEE.—The Contractor hereby unconditionally guarantees that the work will be done in conformance with the requirements of the contract, and further guarantees the work of the contract to be and remain free of defects in workmanship and materials for a period of one year from the date of acceptance of the contract, unless a longer guarantee period is required by the special provisions. The Contractor hereby agrees to repair or replace any and all work, together with any other adjacent work which may be displaced in so doing, that may prove to be not in conformance with the requirements of the contract or that may be defective in its workmanship or material within the guarantee period specified, without any expense whatsoever to the Department, ordinary wear and tear and unusual abuse or neglect excepted.

Contract bonds shall remain in full force and effect during the guarantee period.

The Contractor further agrees, that within 10 calendar days after being notified in writing by the Department of any work not in conformance with the requirements of the contract or any defects in the work, the Contractor shall commence and prosecute with due diligence all work necessary to fulfill the terms of this guarantee, and shall complete the work within a reasonable period of time, and, in the event the Contractor fails to comply, the Contractor does hereby authorize the Department to proceed to have the work done at the Contractor's expense and the Contractor shall honor and pay the cost and charges therefor upon demand. The Department shall be entitled to all costs and expenses, including reasonable attorney's fees, necessarily incurred upon the Contractor's refusal to honor and pay the above costs and charges.

DIVISION 1. GENERAL REQUIREMENTS

1.01 SCOPE

The building work described herein and as shown on the plans shall conform to the requirements of the General Conditions and these special provisions.

The building work to be done consists, in general, of remodeling the existing office and equipment buildings and constructing a new equipment building at the Camp Angelus Maintenance Station, including all such items or details, not mentioned above, that are required by the plans, General Conditions, or these special provisions necessary to be placed, constructed or installed for a complete, useable facility.

Specific work includes, but is not limited to the following:

A. Install new metal roofing on existing Sand Storage, Equipment Bay, Office, and Emergency Generator Buildings.
B. Construct new steel Wash Rack Canopy and wash slab (Building 2).
C. Construct new CMU Washrack Equipment Building.
D. Install new Propane Tanks and Slab.
E. Construct new Lift station and Clarifier unit.
F. Site utilities work including mechanical, electrical, and water/wastewater.

1.02 AREAS FOR CONTRACTOR'S USE

The Contractor shall arrange with the Engineer for areas to store equipment and materials within the work area.

1.03 COOPERATION

Attention is directed to Sections 5-1.06, "Responsibility for Utilities," and 5-1.12, "Cooperation," of the General Conditions and these special provisions.

Work by State forces will be in progress within the contract limits during the working period for this contract.

The Contractor shall comply with all security policies and hours of the State concerning the Camp Angelus Maintenance Station.

The Contractor shall plan his work to minimize interference with State forces and the public. Interruptions to any services for the purpose of making or breaking a connection shall be made only after consultation with and for such time periods as directed by the Engineer.

1.04 MEASUREMENT AND PAYMENT

The contract lump sum price paid for building work shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the building work, complete in place, as shown on the plans, as specified in the General Conditions and these special provisions, and as directed by the Engineer

Full compensation for any incidental materials and labor, not shown on the plans or specified, which are necessary to complete the building work shall be considered as included in the contract lump sum price paid for building work and no additional compensation will be allowed therefor.

1.05 SUBMITTALS

Shop drawings, material lists, descriptive data, samples and other submittals specified in these special provisions shall be submitted for approval in accordance with the provisions in Section 2-1.04, "Shop Drawings, Descriptive Data, Samples, and Alternatives," of the General Conditions and these special provisions

Unless otherwise permitted in writing by the Engineer and except submittals for "Alternatives" in conformance with the provisions of said Section 2-1.04 of the General Conditions, all submittals required by these special provisions shall be submitted within 35 days after the contract has been approved.

Attention is directed to the provisions in Section 2-1.01, "Authority of Engineer," of the General Conditions. The Engineer may request submittals for materials or products where submittals have not been specified in these special provisions, or may request that additional information be included in specified submittals, as necessary to determine the quality or acceptability of such materials or products.

Submittals shall be delivered to the locations indicated in these special provisions. If a specific location is not indicated, the submittal shall be delivered to the Division of Structure Design, Documents Unit, Fourth Floor, Mail Station 9-4/4I, 1801 30th Street, Sacramento, California 95816, telephone (916) 227-8252, or the submittals shall be mailed to the Division of Structure Design, Documents Unit, Mail Station 9-4/4I, P. O. Box 942874, Sacramento, California 94274-0001.

1.06 SCHEDULE OF VALUES

The Contractor shall prepare and submit to the Engineer for approval 2 copies of a Schedule of Values within 15 working days of approval of the contract. The Engineer shall be allowed 15 working days for approval or return for correction of each submittal or resubmittal. Should the Engineer fail to complete the review within the time specified and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in review, an extension of time commensurate with the delay in completion of the work thus caused will be granted as provided in Section 6-1.08, "Liquidated Damages," of the General Conditions.

The Schedule of Values shall cover each lump sum item for building work and shall be accurately divided into sections representing the cost of each separate building or structure. Any site work that is not part of a separate building or structure shall be included under a specific section as General Work and not included in the building or structure cost. Indirect costs and general condition items are to be listed as a separate line item of work. The sections representing each building or structure must be identified as to the building or structure they represent and be broken down to show the corresponding value of each craft, trade or other significant portion of the work. A sub-total for each section shall be provided.

The Schedule of Values shall be approved by the Engineer before any partial payment estimate is prepared.

The sum of the items listed in the Schedule of Values shall equal the contract lump sum price for building work. Overhead and profit shall not be listed as separate items, but shall be appropriately distributed across all line items of cost.

1.07 OBSTRUCTIONS

Attention is directed to Sections 5-1.02, "Protection and Use of Property," 5-1.03, "Responsibility for Damage," and 5-1.06, "Responsibility for Utilities," of the General Conditions and these special provisions.

The Contractor shall notify the Engineer and the appropriate regional notification center for operators of subsurface installations at least 5 working days prior to performing any excavation or other work close to any underground pipeline, conduit, duct, wire or other structure. Regional notification centers include but are not limited to the following:

Underground Service Alert
Northern California (USA)
Telephone: 1(800)642-2444

Underground Service Alert
Southern California (USA)
Telephone: 1(800)422-4133

South Shore Utility
Coordinating Council (DIGS)
Telephone: 1(800)541-3447

Western Utilities
Underground Alert, Inc.
Telephone: 1(800)424-3447

1.08 PRESERVATION OF PROPERTY

Attention is directed to Sections 5-1.02, "Protection and Use of Property," 5-1.03, "Responsibility for Damage," 5-1.05, "Contractor's Responsibility for the Work," and 5-1.06, "Responsibility for Utilities," of the General Conditions.

Operations shall be conducted in such a manner that existing facilities, surfacing, installations, and utilities which are to remain in place will not be damaged. Temporary surfacing, facilities, utilities and installations shall also be protected until they are no longer required. The Contractor, at his expense shall furnish and install piling, sheet piling, cribbing, bulkheads, shores, or whatever means may be necessary to adequately support material carrying such facilities, or to support the facilities themselves and shall maintain such support until they are no longer needed.

1.09 WATER POLLUTION CONTROL

PART 1. GENERAL

SUMMARY.--

Scope.--This work shall consist of providing water pollution control measures in conformance with the details shown on the plans, the provisions in Section 5-1.01R, "Water Pollution Control," of the General Conditions and these special provisions.

Water pollution control work shall conform to the requirements in the "Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual" and the "Construction Site Best Management Practices (BMPs) Manual," and addenda thereto issued up to, and including, the date of advertisement of the project. These manuals are hereinafter referred to respectively as the "Preparation Manual" and the "Construction Site BMPs Manual," and collectively, as the "Manuals." Copies of the Manuals may be obtained from the Department of Transportation, Materiel Operations Branch, Publication Distribution Unit, 1900 Royal Oaks Drive, Sacramento, California 95815, Telephone: (916) 445-3520, and may also be obtained from the Department's Internet website at: http://www.dot.ca.gov/hq/construc/stormwater.html.

The Contractor shall know and fully comply with applicable provisions of the Manuals, and Federal, State, and local regulations and requirements that govern the Contractor's operations and storm water and non-storm water discharges from both the project site and areas of disturbance outside the project site during construction. Attention is directed to Sections 5-1.01, "Laws to be Observed," 5-1.031, "Indemnification," and 5-1.032, "Insurance," of the General Conditions.

Water pollution control requirements shall apply to storm water and non-storm water discharges from areas outside the project site which are directly related to construction activities for this contract including, but not limited to, material borrow areas, staging areas, storage yards and access roads. The Contractor shall comply with the Manuals for those areas and shall implement, inspect and maintain the required water pollution control practices. Installing, inspecting and maintaining water pollution control practices on areas outside the project site not specifically arranged and provided for by the Department for the execution of this contract, will not be paid for.

The Contractor shall be responsible for penalties assessed or levied on the Contractor or the Department as a result of the Contractor's failure to comply with the provisions in this division "Water Pollution Control" including, but not limited to, compliance with the applicable provisions of the Manuals, and Federal, State and local regulations and requirements as set forth therein.

Penalties as used in this division shall include fines, penalties and damages, whether proposed, assessed, or levied against the Department or the Contractor, including those levied under the Federal Clean Water Act and the State Porter-Cologne Water Quality Control Act, by governmental agencies or as a result of citizen suits. Penalties shall also include payments made or costs incurred in settlement for alleged violations of the Manuals, or applicable laws, regulations, or requirements. Costs incurred could include sums spent instead of penalties, in mitigation or to remediate or correct violations.

RETENTION OF FUNDS

Notwithstanding any other remedies authorized by law, the Department may retain money due the Contractor under the contract, in an amount determined by the Department, up to and including the entire amount of Penalties proposed, assessed, or levied as a result of the Contractor's violation of the Manuals, or Federal or State law, regulations or requirements. Funds may be retained by the Department until final disposition has been made as to the Penalties. The Contractor shall remain liable for the full amount of Penalties until such time as they are finally resolved with the entity seeking the Penalties.

Retention of funds for failure to conform to the provisions in this division, "Water Pollution Control," shall be in addition to the other retention amounts required by the contract. The amounts retained for the Contractor's failure to conform to provisions in this division will be released for payment on the next monthly estimate for partial payment following the date when an approved WPCP has been implemented and maintained, and when water pollution has been adequately controlled, as determined by the Engineer.

When a regulatory agency identifies a failure to comply with the Manuals, or other Federal, State or local requirements, the Department may retain money due the Contractor, subject to the following:

A. The Department will give the Contractor 30 days notice of the Department's intention to retain funds from partial payments which may become due to the Contractor prior to acceptance of the contract. Retention of funds from payments made after acceptance of the contract may be made without prior notice to the Contractor.
B. No retention of additional amounts out of partial payments will be made if the amount to be retained does not exceed the amount being withheld from partial payments pursuant to Section 7-1.05, "Partial Payments," of the General Conditions.
C. If the Department has retained funds, and it is subsequently determined that the State is not subject to the entire amount of the Costs and Liabilities assessed or proposed in connection with the matter for which the retention was made, the Department shall be liable for interest on the amount retained for the period of the retention. The interest rate payable shall be 6 percent per annum.

During the first estimate period that the Contractor fails to conform to the provisions in this division, "Water Pollution Control," the Department may retain an amount equal to 25 percent of the estimated value of the contract work performed.

The Contractor shall notify the Engineer immediately upon request from the regulatory agencies to enter, inspect, sample, monitor, or otherwise access the project site or the Contractor's records pertaining to water pollution control work. The Contractor and the Department shall provide copies of correspondence, notices of violations, enforcement actions or proposed fines by regulatory agencies to the requesting regulatory agency.

WATER POLLUTION CONTROL PROGRAM PREPARATION, APPROVAL AND AMENDMENTS

As part of the water pollution control work, a Water Pollution Control Program (WPCP) is required for this contract. The WPCP shall conform to the provisions in Section 5-1.01R, "Water Pollution," of the General Conditions, the requirements in the Manuals, and these special provisions. Upon the Engineer's approval of the WPCP, the WPCP shall be considered to fulfill the provisions in Section 5-1.01R, "Water Pollution," of the General Conditions for development and submittal of a Water Pollution Control Program.

No work having potential to cause water pollution, shall be performed until the WPCP has been approved by the Engineer. Approval shall not constitute a finding that the WPCP complies with applicable requirements of the Manuals and applicable Federal, State and local laws, regulations, and requirements.

The Contractor shall designate a Water Pollution Control Manager. The Water Pollution Control Manager shall be responsible for the preparation of the WPCP and required modifications or amendments, and shall be responsible for the implementation and adequate functioning of the various water pollution control practices employed. The Contractor may designate different Water Pollution Control Managers to prepare the WPCP and to implement the water pollution control practices. The Water Pollution Control Manager(s) shall serve as the primary contact for issues related to the WPCP or its implementation. The Contractor shall assure that the Water Pollution Manager(s) have adequate training and qualifications necessary to prepare the WPCP, implement and maintain water pollution control practices.

Within 10 working days after the approval of the contract, the Contractor shall submit 3 copies of the draft WPCP to the Engineer. The Engineer will have 10 working days to review the WPCP. If revisions are required, as determined by the Engineer, the Contractor shall revise and resubmit the WPCP within 10 working days of receipt of the Engineer's comments. The Engineer will have 5 working days to review the revisions. Upon the Engineer's approval of the WPCP, 4 approved copies of the WPCP, incorporating the required changes, shall be submitted to the Engineer. In order to allow construction activities to proceed, the Engineer may conditionally approve the WPCP while minor revisions are being completed. In the event the Engineer fails to complete the review within the time allowed, and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for resulting losses, and an extension of time will be granted, as provided in Section 6-1.08, "Liquidated Damages," of the General Conditions.

The WPCP shall incorporate water pollution control practices in the following categories:

A. Soil stabilization.
B. Sediment control.
C. Wind erosion control.
D. Tracking control.
E. Non-storm water management.
F. Waste management and materials pollution control.

The Contractor shall develop a Water Pollution Control Schedule that describes the timing of grading or other work activities that could affect water pollution. The Water Pollution Control Schedule shall be updated by the Contractor to reflect changes in the Contractor's operations that would affect the necessary implementation of water pollution control practices.

The Contractor shall complete the BMP checklists for each of the 6 categories presented in Section 3 of the Preparation Manual and shall incorporate the completed checklists and water pollution control practices into Sections 30.1, 30.2, and 30.3 of the WPCP. Water pollution control practices include the "Minimum Requirements" and other Contractor-selected water pollution control practices from the BMP checklists and "Project-Specific Minimum Requirements" identified in the Water Pollution Control Cost Break-Down of this division.

The WPCP shall include, but not be limited to, the items described in the Manuals and related information contained in the contract documents.

The Contractor shall prepare an amendment to the WPCP when there is a change in construction activities or operations which may affect the discharge of pollutants to surface waters, ground waters, municipal storm drain systems, or when the Contractor's activities or operations violate Federal, State or local regulations, or when directed by the Engineer. Amendments shall identify additional water pollution control practices or revised operations, including those areas or operations not identified in the initially approved WPCP. Amendments to the WPCP shall be prepared and submitted for review and approval within a time approved by the Engineer, but in no case longer than the time specified for the initial submittal and review of the WPCP.

The Contractor shall keep one copy of the approved WPCP and approved amendments at the project site. The WPCP shall be made available upon request by a representative of the Regional Water Quality Control Board, State Water Resources Control Board, United States Environmental Protection Agency, or the local storm water management agency. Requests by the public shall be directed to the Engineer.

COST BREAK-DOWN

The Contractor shall include a Water Pollution Control Cost Break-Down in the WPCP which itemizes the cost for water pollution control work shown in the WPCP. The Contractor shall use the Water Pollution Control Cost Break-Down provided in this division as the basis for the cost break-down submitted with the WPCP. The Contractor shall use the Water Pollution Control Cost Break-Down to identify items, quantities and values for water pollution control work. The Contractor shall be responsible for the accuracy of the WPCP quantities and values used in the cost break-down submitted with the WPCP. Partial payment for water pollution control will not be made until the Water Pollution Control Cost Break-Down is approved by the Engineer.

Line items indicated in the Water Pollution Control Cost Break-Down in this division with a specified Estimated Quantity shall be considered a "Project-Specific Minimum Requirement." The Contractor shall incorporate the items with Contractor-designated quantities and values into the Water Pollution Control Cost Break-Down submitted with the WPCP.

Line items indicated in the Water Pollution Control Cost Break-Down in this division without a specified Estimated Quantity shall be considered by the Contractor for selection to meet the applicable "Minimum Requirements" as defined in the Manuals, or for other water pollution control work as identified in the BMP checklists presented in Section 3 of the Preparation Manual. In the Water Pollution Control Cost Break-Down submitted with the WPCP, the Contractor shall list only those water pollution control practices selected for the project, including quantities and values required to complete the work for those items.

The sum of the amounts for the work listed in the Water Pollution Control Cost Break-Down shall be equal to the cost shown for water pollution control in the cost break-down for building work. Overhead and profit shall be included in each individual item listed in the Water Pollution Control Cost Break-Down.

WATER POLLUTION CONTROL COST BREAK-DOWN

Contract No. 08-479504

ITEM	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	VALUE	AMOUNT
SS-3	Hydraulic Mulch	M2			
SS-4	Hydroseeding	M2			
SS-5	Soil Binders	M2			
SS-6	Straw Mulch	M2			
SS-7	Geotextiles, Plastic Covers & Erosion Control Blankets/Mats	M2			
SS-8	Wood Mulching	M2			
SS-9	Earth Dikes/Drainage Swales & Lined Ditches	M			
SC-1	Silt Fence	M			
SC-4	Check Dam	EA			
SC-5	Fiber Rolls	M			
SC-6	Gravel Bag Berm	M			
SC-7	Street Sweeping and Vacuuming	LS			
SC-8	Sandbag Barrier	M			
SC-9	Straw Bale Barrier	M			
SC-10	Storm Drain Inlet Protection	EA			
WE-1	Wind Erosion Control	LS			
TC-1	Stabilized Construction Entrance/Exit	EA			
TC-2	Stabilized Construction Roadway	EA			
TC-3	Entrance/Outlet Tire Wash	EA			

ITEM	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	VALUE	AMOUNT
NS-1	Water Conservation Practices	LS			
NS-3	Paving and Grinding Operations	LS			
NS-5	Clear Water Diversion	EA			
NS-6	Illicit Connection/Illegal Discharge Detection and Reporting	LS			
NS-7	Potable Water/Irrigation	LS			
NS-8	Vehicle and Equipment Cleaning	LS			
NS-9	Vehicle and Equipment Fueling	LS			
NS-10	Vehicle and Equipment Maintenance	LS			
WM-1	Material Delivery and Storage	LS			
WM-2	Material Use	LS			
WM-3	Stockpile Management	LS			
WM-4	Spill Prevention and Control	LS			
WM-5	Solid Waste Management	LS			
WM-6	Hazardous Waste Management	LS			
WM-7	Contaminated Soil Management	LS			
WM-8	Concrete Waste Management	LS			
WM-9	Sanitary/Septic Waste Management	LS			
WM-10	Liquid Waste Management	LS			

TOTAL _____

Adjustments in the quantities listed in the approved Water Pollution Control Cost Break-Down shall be made when required to address amendments to the WPCP, except when the adjusted items are paid for in conformance with the provisions in Section 3, "Changes," of the General Conditions.

No adjustment in compensation will be made for work completed as shown on the approved WPCP. No adjustment in compensation will be made for ordered changes to correct WPCP work resulting from the Contractor's own operations or from the Contractor's negligence.

The approved cost break-down will be used to determine partial payments during the progress of the work and as the basis for calculating the adjustment in compensation for increases or decreases of quantities ordered by the Engineer. When an ordered change increases or decreases the quantities of an approved cost break-down item, the adjustment in compensation will be determined in conformance with the provisions in Section 3, "Changes," of the General Conditions. If an ordered change requires a new item which is not on the approved cost break-down, the adjustment in compensation will be determined in conformance with the provisions in Section 3, "Changes," of the General Conditions.

If requested by the Contractor and approved by the Engineer, changes to the water pollution control practices listed in the approved cost break-down, including addition of new water pollution control practices, will be allowed. Changes shall be included in the approved amendment of the WPCP. If the requested changes result in a net cost increase, an adjustment in compensation will be made. The net cost increase to the lump sum item Building Work will be paid for in conformance with the provisions in Section 3, "Changes," of the General Conditions.

WPCP IMPLEMENTATION

Unless otherwise specified, upon approval of the WPCP, the Contractor shall be responsible throughout the duration of the project for installing, constructing, inspecting, maintaining, removing, and disposing of the water pollution control practices specified in the WPCP and in the amendments. Unless otherwise directed by the Engineer, the Contractor's responsibility for WPCP implementation shall continue throughout any temporary suspension of work ordered in conformance with the provisions in Section 6-1.06, "Temporary Suspension of Work," of the General Conditions. Requirements for installation, construction, inspection, maintenance, removal, and disposal of water pollution control practices shall conform to the requirements in the Manuals and these special provisions.

If the Contractor or the Engineer identifies a deficiency in the implementation of the approved WPCP or amendments, the deficiency shall be corrected immediately. The deficiency may be corrected at a later date and time if requested by the Contractor and approved by the Engineer in writing, but shall be corrected prior to the onset of precipitation. If the Contractor fails to correct the identified deficiency by the date agreed or prior to the onset of precipitation, the project shall be in nonconformance with this division. Attention is directed to Section 2-1.01, "Authority of Engineer," of the General Conditions, and to "Retention of Funds" of this division for possible nonconformance penalties.

If the Contractor fails to conform to the provisions of this division, "Water Pollution Control," the Engineer may order the suspension of construction operations until the project complies with the requirements of this division.

Implementation of water pollution control practices may vary by season. The Construction Site BMPs Manual and these special provisions shall be followed for control practice selection of year-round, rainy season and non-rainy season water pollution control practices.

Year-Round Implementation Requirements

The Contractor shall have a year-round program for implementing, inspecting and maintaining water pollution control practices for wind erosion control, tracking control, non-storm water management, and waste management and materials pollution control.

The National Weather Service weather forecast shall be monitored and used by the Contractor on a daily basis. An alternative weather forecast proposed by the Contractor may be used if approved by the Engineer. If precipitation is predicted, the necessary water pollution control practices shall be deployed prior to the onset of the precipitation.

Disturbed soil areas shall be considered active whenever the soil disturbing activities have occurred, continue to occur or will occur during the ensuing 21 days. Nonactive areas shall be protected as prescribed in the Construction Site BMPs Manual within 14 days of cessation of soil disturbing activities or prior to the onset of precipitation, whichever occurs first.

Rainy Season Implementation Requirements

Soil stabilization and sediment control practices conforming to the requirements of these special provisions shall be provided throughout the rainy season, defined as between October 1 and May 1.

An implementation schedule of required soil stabilization and sediment control practices for disturbed soil areas shall be completed no later than 20 days prior to the beginning of each rainy season. The implementation schedule shall identify the soil stabilization and sediment control practices and the dates when the implementation will be 25 percent, 50 percent and 100 percent complete, respectively. For construction activities beginning during the rainy season, the Contractor shall implement applicable soil stabilization and sediment control practices.

Non-Rainy Season Implementation Requirements

The non-rainy season shall be defined as days outside the defined rainy season. The Contractor's attention is directed to the Construction Site BMPs Manual for soil stabilization and sediment control implementation requirements on disturbed soil areas during the non-rainy season. Disturbed soil areas within the project shall be protected in conformance with the requirements in the Construction Site BMPs Manual with an effective combination of soil stabilization and sediment control.

MAINTENANCE

To ensure the proper implementation and functioning of water pollution control practices, the Contractor shall regularly inspect and maintain the construction site for the water pollution control practices identified in the WPCP. The construction site shall be inspected by the Contractor as follows:

A. Prior to a forecast storm.
B. After a precipitation event which causes site runoff.
C. At 24 hour intervals during extended precipitation events.
D. Routinely, a minimum of once every two weeks outside of the defined rainy season.
E. Routinely, a minimum of once every week during the defined rainy season.

The Contractor shall use the Storm Water Quality Construction Site Inspection Checklist provided in the Preparation Manual or an alternative inspection checklist provided by the Engineer. One copy of each site inspection record shall be submitted to the Engineer within 24 hours of completing the inspection.

REPORTING REQUIREMENTS

Report of Discharges, Notices or Orders

If the Contractor identifies discharges into surface waters or drainage systems in a manner causing, or potentially causing, a condition of pollution, or if the project receives a written notice or order from a regulatory agency, the Contractor shall immediately inform the Engineer. The Contractor shall submit a written report to the Engineer within 7 days of the discharge event, notice or order. The report shall include the following information:

A. The date, time, location, nature of the operation, and type of discharge, including the cause or nature of the notice or order.
B. The water pollution control practices deployed before the discharge event, or prior to receiving the notice or order.
C. The date of deployment and type of water pollution control practices deployed after the discharge event, or after receiving the notice or order, including additional measures installed or planned to reduce or prevent reoccurrence.
D. An implementation and maintenance schedule for affected water pollution control practices.

Report of First-Time Non-Storm Water Discharge

The Contractor shall notify the Engineer at least 3 days in advance of first-time non-storm water discharge events. The Contractor shall notify the Engineer of the operations causing non-storm water discharges and shall obtain field approval for first-time non-storm water discharges. Non-storm water discharges shall be monitored at first-time occurrences and routinely thereafter.

PAYMENT

Full compensation for water pollution control shall be considered as included in the contract lump sum price paid for building work and no additional compensation will be allowed therefor.

Attention is directed to Section 7-1.05, "Partial Payment," and Section 7-1.07, "Final Payment and Claims," of the General Conditions. Payments for Prepare Water Pollution Control Program will be made as follows:

A. After the WPCP has been approved by the Engineer, 75 percent of the cost shown in the Water Pollution Control Plan Cost Break-Down for prepare storm water pollution prevention plan will be included in the monthly partial payment estimate.
B. After acceptance of the contract in conformance with the provisions in Section 7-1.07, "Final Payment and Claims," of the General Conditions, payment for the remaining 25 percent of the cost shown in the Water Pollution Control Plan Cost Break-Down for prepare water pollution control plan will be made.

1.10 UTILITY CONNECTION

The Contractor shall make all arrangements and obtain all permits and licenses required for the extension of and connection to each utility service applicable to this project, shall furnish all labor and materials necessary for such extensions which are not performed or provided by the utility, and shall furnish and install any intermediate equipment required by the serving utilities.

Upon written request by the Contractor, the State will pay all utility permits, licenses, connection charges, and excess length charges directly to the utility. Such request shall be submitted not less than 45 days before service connections are required.

The costs incurred by the Contractor for the extension of utilities beyond the limits shown on the plans, and in furnishing and installing any intermediate equipment required by the serving utilities, will be paid for as an ordered change as provided in Section 3, "Changes in the Work," of the General Conditions.

Full compensation for any costs incurred by the Contractor to obtain the permits and licenses shall be considered as included in the contract lump sum price paid for building work and no additional compensation will be allowed therefor.

1.11 TEMPORARY UTILITIES

The Contractor may obtain electrical power and water from existing State outlets within the contract limits free of charge for contract operations where such utilities exist, provided that such utility services are in service and are not required by the State for other purposes and subject to the provisions in "Cooperation" of these special provisions.

The Contractor, at his own expense, shall obtain any additional electrical power and water or other utilities required for his operations and shall make and maintain the necessary service connections.

The Contractor shall provide and pay for telephone service he may require. State telephone facilities shall not be used.

The Contractor shall provide adequate temporary lighting to perform the work and allow the Engineer to inspect the project as each portion is completed.

1.12 SANITARY FACILITIES

State sanitary facilities will not be available for use by the Contractor's employees, during normal State working hours. Tools shall not be cleaned nor shall cleaning liquids be disposed of in State sanitary facilities or sewers.

Separate toilet facilities shall be provided for Contractor personnel. Facilities shall include the periodic flushing, waste removal and cleaning of such facilities. Units shall be maintained in a clean and sanitary condition, including a supply of toilet tissue, toilet seat covers, paper towels and paper cups. Waste material shall be disposed of off site in a lawful manner. Temporary toilet units shall be single occupant units of the chemical type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material.

1.13 REFERENCES

Attention is directed to Section 1-1.26, "Abbreviations," of the General Conditions

When reference is made to the Uniform Building Code (UBC) on the plans or in the special provisions, it shall be the 1997 Uniform Building Code as amended by the 2001 Title 24 California Building Standards Code.

1.14 PROJECT RECORD DRAWINGS

The Contractor shall prepare and maintain one set of project record drawings, using an unaltered set of original project plans, to clearly show all as-constructed information for the project. As a minimum, the information to be shown shall include 1) any plan clarifications or change orders, 2) locations of any underground utilities, or 3) the location, size, type, and manufacturer of all major products or components selected by the Contractor for use in the work.

All markings shall be placed on the project record drawings using red ink or red pencil. Original figures shall not be eradicated nor written over and superseded material shall be neatly lined out. Additional drawings shall be submitted if the required information cannot be clearly shown on the original set of project plans. The additional drawings shall be not less than 279 mm x 432 mm in size and shall have the contract number on each sheet. The Contractor shall sign and date each sheet of the project record drawings to verify that all as-constructed information shown on the drawings is correct.

The Contractor shall periodically review the set of project record drawings with the Engineer during the progress of the work to assure that all changes and other required information are being recorded.

Before completion of the work, the Contractor shall request a review of the project record drawings to determine the completeness and adequacy of them. If the project record drawings are unacceptable, the Contractor shall inspect, measure, and survey the project as necessary to record the required additional information.

The set of completed project record drawings shall be delivered to the Engineer prior to acceptance of the contract.

1.15 FIELD ENGINEERING

This section specifies administrative and procedural requirements for field engineering services to be performed by the Contractor.

Lines and grades.--Such stakes or marks will be set by the Engineer as he determines to be necessary to establish the lines and grades required for the completion of the work shown on the plans and as specified in these special provisions. In general, these will consist of the primary vertical and horizontal control points.

Stakes and marks set by the Engineer shall be carefully preserved by the Contractor. In case such stakes and marks are destroyed or damaged they will be replaced at the Engineer's earliest convenience. The Contractor will be charged for the cost of necessary replacement or restoration of such stakes and marks which in the judgment of the Engineer were carelessly or willfully destroyed or damaged by the Contractor's operations. This charge will be deducted from any moneys due or to become due the Contractor.

All other stakes or marks required to establish the lines and grades required for the completion of the work shall be the responsibility of the Contractor.

Existing utilities and equipment.--The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, the Contractor shall investigate and verify the existence and location of underground utilities and other construction.

Prior to construction, the Contractor shall verify the location and invert elevation at points of connection of sanitary and septic sewers, storm sewer, and water or fire service piping.

Surveys for layout and performance.--The Contractor shall perform all surveys for layout and performance, reduce field notes, and make all necessary calculations and drawings necessary to carry out the work.

The Contractor shall locate and layout site improvements, and other work requiring field engineering services, including pavements, stakes for grading, fill and topsoil placement, utility slopes and invert elevations by instrumentation and similar appropriate means.

Batter boards shall be located and laid out for structures, building foundations, column grids and locations, floor levels and, control lines and levels required for mechanical and electrical work.

Survey accuracy and tolerances.--The tolerances generally applicable in setting survey stakes for foundations, slabs, and underground work shall not exceed the following:

Survey Stakes or Markers	Tolerance
Rough grading or excavation	30 mm
Trimming or preparation of subgrade for roadways	15 mm
Roadway surfacing, steel or concrete pipe	6 mm
Structures or building construction	3 mm

Such tolerance shall not supersede stricter tolerances required by the plans or special provisions, and shall not otherwise relieve the Contractor of responsibility for measurements in compliance therein.

1.16 ASBESTOS

The Contractor shall take special precautions for that portion of the work which may involve the handling of materials which contain asbestos, during demolition or construction. The building areas involving alteration known to contain asbestos containing materials. A hazardous material survey report by Centrum Analytical Laboratories dated November 5, 2002 (Job ID 21319) is available as an Informational Handout. The following items tested positive for Asbestos containing material:

Asbestos Containing Materials (East and Wet bound facilities)		
Item	**Description**	**crysotile asbestos**
Black tar-like material	Existing flat roof	10%
Brown fibrous material	Existing flat roof	0%

Attention is directed to "Removal and Disposal of Asbestos" in Division 2, "Sitework," of these special provisions regarding governing codes and requirements for the removal and disposal of materials containing asbestos.

Materials containing asbestos, which are designated on the plans or specified in these special provisions to be removed and disposed of, shall be disposed of away from the premises. The Contractor shall make his own arrangements for disposing of such materials, and shall pay all the costs involved. Said arrangements shall include, but not necessarily be limited to entering into agreements with said disposal site property owners and obtaining all required permits, licenses and environmental clearances. Prior to disposing of any material away from the premises, the Contractor shall furnish to the Engineer satisfactory evidence that the Contractor has entered into agreements with the property owners of the disposal site involved and has obtained said permits, licenses and clearances.

1.17 LEAD BASED MATERIALS

The Contractor shall take special precautions for that part of the work which involve the demolition and handling of materials which may contain lead during demolition or construction. The building areas to be removed are known to contain lead containing materials. A hazardous material survey report by Centrum Analytical Laboratories dated November 5, 2002 (Job ID 21319) is available as an Informational Handout. The following items tested positive for lead-based paint:

Lead-based paint (east and west bound facilities)			
Item	**Description**	**Reporting Limit mg/kg**	**mg/kg**
Paint south west side of building	Sample 1	0.50	1,100
Paint south east side of building	Sample 2	0.50	1,600
Paint north west side of building	Sample 3	0.50	770
Paint north east side of building	Sample 4	0.50	110

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Any work that disturbs the existing paint system may expose workers to health hazards and may (1) produce amounts of material and residue containing heavy metal which exceed the hazardous thresholds established in the California Code of Regulations or (2) produce toxic fumes when heated.

Attention is directed to “Lead Abatement,” in Division 2 of these special provisions–regarding governing codes and requirements for the removal and disposal of lead based materials.

1.18 SUBSTITUTION OF NON-METRIC MATERIALS AND PRODUCTS

Only materials and products conforming to the requirements of the specifications shall be incorporated in the work. When metric materials and products are not available, and when approved by the Engineer, and at no cost to the State,

materials and products in the inch-pound (imperial) system which are of equal quality and of the required properties and characteristics for the purpose intended, may be substituted for the equivalent metric materials and products, subject to the following requirements:

Materials and products shown on the plans or in the special provisions as being equivalent may be substituted for the metric materials and products specified or detailed on the plans.

Before other non-metric materials and products will be considered for use the Contractor shall furnish, at the Contractor's expense, evidence satisfactory to the Engineer that the materials and products proposed for use are equal to or better than the materials and products specified or detailed on the plans. The burden of proof as to the quality and suitability of substitutions shall be upon the Contractor and the Contractor shall furnish all information necessary as required to the Engineer. The Engineer will be the sole judge as to the quality and suitability of the substituted materials and products and the Engineer's decision shall be final.

When the Contractor elects to substitute non-metric materials and products, including materials and products shown on the plans or in the special provisions as being equivalent, a list of substitutions to be made shall be submitted for approval.

The following substitutions of materials and products will be allowed:

SUBSTITUTION TABLE FOR SIZES OF HIGH STRENGTH STEEL FASTENERS, ASTM Designation: A 325M	
METRIC SIZE SHOWN ON THE PLANS mm x thread pitch	IMPERIAL SIZE TO BE SUBSTITUTED inch
M16 x 2	5/8
M20 x 2.5	3/4
M22 x 2.5	7/8
M24 x 3	1
M27 x 3	1-1/8
M30 x 3.5	1-1/4
M36 x 4	1-1/2

SUBSTITUTION TABLE FOR REINFORCEMENT	
METRIC BAR DESIGNATION NUMBER AS SHOWN ON THE PLANS	IMPERIAL BAR DESIGNATION NUMBER TO BE SUBSTITUTED
10	3
13	4
16	5
19	6
22	7
25	8
29	9
32	10
36	11
43	14
57	18

SUBSTITUTION TABLE FOR WELDED PLAIN WIRE REINFORCEMENT, ASTM DESIGNATION: A 185	
	US CUSTOMARY UNITS SIZE TO BE SUBSTITUTED $inch^2$ x 100
MW9	W1.4
MW10	W1.6
MW13	W2.0
MW15	W2.3
MW19	W2.9
MW20	W3.1
MW22	W3.5
MW25	W3.9, except W3.5 in piles only
MW26	W4.0
MW30	W4.7
MW32	W5.0
MW35	W5.4
MW40	W6.2
MW45	W6.5
MW50	W7.8
MW55	W8.5, except W8.0 in piles only
MW60	W9.3
MW70	W10.9, except W11.0 in piles only
MW80	W12.4
MW90	W14.0
MW100	W15.5

The sizes in the following tables of materials and products are exact conversions of metric sizes of materials and products and are listed as acceptable equivalents:

CONVERSION TABLE FOR SIZES OF: (1) STEEL FASTENERS FOR GENERAL APPLICATIONS, ASTM Designation: A 307 or AASHTO Designation: M 314, Grade 36 or 55, and (2) HIGH STRENGTH STEEL FASTENERS, ASTM Designation: A 325 or A 449	
DIAMETER	
METRIC SIZE SHOWN ON THE PLANS mm	EQUIVALENT IMPERIAL SIZE inch
6, or 6.35	1/4
8 or 7.94	5/16
10, or 9.52	3/8
11, or 11.11	7/16
13 or 12.70	1/2
14, or 14.29	9/16
16, or 15.88	5/8
19,or 19.05	3/4
22, or 22.22	7/8
24, 25, or 25.40	1
29, or 28.58	1-1/8
32, or 31.75	1-1/4
35, or 34.93	1-3/8
38 or 38.10	1-1/2
44, or 44.45	1-3/4
51, or 50.80	2
57, or 57.15	2-1/4
64, or 63.50	2-1/2
70 or 69.85	2-3/4
76, or 76.20	3
83, or 82.55	3-1/4
89 or 88.90	3-1/2
95, or 95.25	3-3/4
102, or 101.60	4

CONVERSION TABLE FOR NOMINAL THICKNESS OF SHEET METAL			
UNCOATED HOT AND COLD ROLLED SHEETS		HOT-DIPPED ZINC COATED (GALVANIZED) SHEETS	
METRIC THICK-NESS SHOWN ON THE PLANS mm	EQUIVA-LENT US STAND-ARD GAGE inch	METRIC THICK-NESS SHOWN ON THE PLANS mm	EQUIVA-LENT GALVAN-IZED SHEET GAGE inch
7.94	0.3125		
6.07	0.2391		
5.69	0.2242		
5.31	0.2092		
4.94	0.1943		
4.55	0.1793		
4.18	0.1644	4.270	0.1681
3.80	0.1495	3.891	0.1532
3.42	0.1345	3.510	0.1382
3.04	0.1196	3.132	0.1233
2.66	0.1046	2.753	0.1084
2.28	0.0897	2.372	0.0934
1.90	0.0747	1.994	0.0785
1.71	0.0673	1.803	0.0710
1.52	0.0598	1.613	0.0635
1.37	0.0538	1.461	0.0575
1.21	0.0478	1.311	0.0516
1.06	0.0418	1.158	0.0456
0.91	0.0359	1.006 or 1.016	0.0396
0.84	0.0329	0.930	0.0366
0.76	0.0299	0.853	0.0336
0.68	0.0269	0.777	0.0306
0.61	0.0239	0.701	0.0276
0.53	0.0209	0.627	0.0247
0.45	0.0179	0.551	0.0217
0.42	0.0164	0.513	0.0202
0.38	0.0149	0.475	0.0187

CONVERSION TABLE FOR WIRE		
METRIC THICKNESS SHOWN ON THE PLANS mm	EQUIVALENT USA STEEL WIRE THICKNESS inch	GAGE NO.
6.20	0.244	3
5.72	0.225	4
5.26	0.207	5
4.88	0.192	6
4.50	0.177	7
4.11	0.162	8
3.76	0.148	9
3.43	0.135	10
3.05	0.120	11
2.69	0.106	12
2.34	0.092	13
2.03	0.080	14
1.83	0.072	15
1.57	0.062	16
1.37	0.054	17
1.22	0.048	18
1.04	0.041	19
0.89	0.035	20

CONVERSION TABLE FOR COMMON NAILS				
NAIL SIZE	METRIC mm		ENGLISH inch	
	Length	Diameter	Length	Diameter
8d	63.5	3.33	2 1/2	0.131
10d	76.2	3.76	3	0.148
16d	88.9	4.11	3 1/2	0.162

CONVERSION TABLE FOR LUMBER	
METRIC NOMINAL SURFACE DRY SIZE mm	EQUIVALENT NOMINAL SURFACE DRY U S SIZE inch
51	2
102	4
152	6
203	8
254	10
305	12

CONVERSION TABLE FOR PLYWOOD	
METRIC mm	ENGLISH inch
6.4	1/4
7.9	5/16
9.5	3/8
11.1	7/16
11.9	15/32
12.7	1/2
15.1	19/32
15.9	5/8
18.3	23/32
19.1	3/4
22.2	7/8
25.4	1
28.6	1 1/8

CONVERSION TABLE FOR INSULATION R-VALUE	
METRIC (K m^2/W)	ENGLISH (HR FT^2 F/BTU)
0.5	3
0.7	4
1.4	8
1.9	11
2.3	13
2.5	14
3.3	19
5.3	30

CONVERSION TABLE FOR VAPOR TRANSMISSION RATING	
METRIC (Perm-m)	ENGLISH (perm-inch)
0.29	0.02

CONVERSION TABLE FOR LOW PRESSURE	
METRIC (Pa)	ENGLISH (Inches of Water Column)
30	0.125
60	0.25
90	0.375
120	0.50
150	0.60
155	0.625
175	0.70
185	0.75
200	0.80
250	1.00
310	1.25

CONVERSION TABLE FOR PRESSURE	
METRIC (kPa)	ENGLISH (psi)
10	1.5
210	30
280	40
350	50
690	100
860	125
1040	150
1100	160
1210	175
1380	200
1730	250
2070	300
2170	315
2410	350
2590	375
2760	400
4830	700
5170	750
5520	800
13800	2000
17200	2500
20700	3000
27600	4000
34500	5000
137900	20000

CONVERSION TABLE FOR MIL THICKNESS	
METRIC (mm)	ENGLISH (inch/1000)
0.10	4
0.13	5
0.15	6
0.50	20
0.75	30
1.00	40

CONVERSION TABLE FOR HVAC DUCTING.	
METRIC (mm)	ENGLISH (inch)
100	4
125	5
150	6
175	7
200	8
225	9
250	10
300	12
360	14
410	16
460	18
510	20
560	22
610	24
660	26
710	28
760	30

CONVERSION TABLE FOR MECHANICAL PIPING		
METRIC (GSP, PVC, BSP, DUCTILE IRON)	METRIC (mm)	ENGLISH (inch)
NPS 1/2	15	1/2
NPS 3/4	20	3/4
NPS 1	25	1
NPS 1 1/4	32	1 1/4
NPS 1 1/2	40	1 1/2
NPS 2	50	2
NPS 2 1/2	65	2 1/2
NPS 3	75	3
NPS 4	100	4
NPS 6	150	6

CONVERSION TABLE FOR LUBRICATION PIPING TUBING WALL THICKNESS	
METRIC (mm)	ENGLISH (inch)
2.1	0.083
0.9	0.035

CONVERSION TABLE FOR HOSE/TUBING SIZES O. D.	
METRIC (mm)	ENGLISH (inch)
6	1/4
10	3/8
13	1/2
16	5/8
19	3/4
22	7/8
25	1

CONVERSION TABLE FOR DRUM SIZES			
METRIC		ENGLISH	
L	kg	gallons	pounds
205	180	55	400
60	55	16	120
19	16	5	35

CONVERSION TABLE FOR POWER	
METRIC (kW)	ENGLISH (HP)
0.037	1/20
0.075	1/10
0.18	1/4
0.25	1/3
0.37	1/2
0.55	3/4
0.75	1
1.1	1 1/2
1.5	2
2.2	3
3.7	5
5.5	7 1/2
7.5	10
11	15
15	20
18.5	25
22	30
30	40
37	50
45	60
55	75
75	100
90	120
110	150

CONVERSION TABLE FOR IMPELLER BALANCE		
SYNCHRONOUS RPM	METRIC (g mm/kg)	ENGLISH (ounce-inch/pound)
720	94	0.059
900	73	0.046
1200	54	0.034
1800	41	0.026
3600	17	0.011

CONVERSION TABLE FOR ELECTRICAL CONDUIT	
METRIC SIZE SHOWN ON THE PLANS mm	EQUIVALENT IMPERIAL SIZE inch
16	1/2
21	3/4
27	1
35	1 1/4
41	1 1/2
53	2
103	4

DIVISION 2. SITEWORK

2.01 REMOVING PORTIONS OF EXISTING FACILITIES

PART 1.- GENERAL

Scope.--This work shall consist of removing portions of the existing facilities, including removal of existing work to gain access to or for new work, in accordance with the details shown on the plans and these special provisions.

PART 2.- PRODUCTS (Not applicable)

PART 3.- EXECUTION

PREPARATION

General.--The limits of removal shall be located and identified. Items to be removed and the interface of items to be removed and items to remain intact shall be identified and marked.

Prior to removing concrete or masonry, a saw cut approximately 25 mm deep shall be made along the limits of removal on all faces that will be visible in the completed work.

REMOVAL

General.--Removal shall be to the limits shown on the plans. Removal shall be done carefully to minimize damage to the portions to remain. Remaining portions that are damaged by the Contractor's operation shall be restored to original condition at the Contractor's expense.

Assemblies to be salvaged which require dismantling for removal shall be matchmarked before dismantling.

Existing apparatuses, devices, or accessories which would be functionally impaired by new construction or remodeling shall be moved, brought out to new surfaces, or provided with new access covers, as necessary to restore apparatuses, devices, or accessories to their original usefulness.

Piping and conduits to be abandoned shall be capped or plugged.

Surfaces that are exposed to view at the limits of removal work shall be patched, bumps shall be removed and depressions filled, and the surface shall be finished to match the existing surrounding surfaces. Depressions in concrete less than 25 mm deep shall be deepened to 25 mm minimum depth before filling with cement mortar.

Anchor bolts and reinforcement shall be removed at least 25 mm below the surrounding surfaces, and the resulting hole shall be patched with cement mortar.

Existing reinforcement that is to be incorporated into the new work shall be protected from damage and thoroughly cleaned before being embedded in new concrete.

DISPOSAL

General.--Materials that are to be removed, shall become the property of the Contractor and shall be disposed of away from the premises. Such disposal shall conform to the laws, rules, and regulations of all agencies having jurisdiction at the disposal site.

SALVAGE

General.--Materials or equipment shown on the plans to be salvaged shall remain the property of the State and shall be removed, cleaned and stockpiled at a location at the project site designated by the Engineer.

2.03 EARTHWORK FOR BUILDING WORK

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of performing earthwork for building work in accordance with the details shown on the plans and these special provisions.

Earthwork for building work shall consist of structure excavation and structure backfill. Structure excavation shall include excavation for footings, foundations, walls, slabs, tanks, clarifiers and trenches. Structure backfill shall include backfilling under slabs; backfilling under and around footings; backfilling for walls, backfilling for pipes and conduits; backfilling holes resulting from removal of existing facilities. In addition to structure excavation and structure backfill, earthwork for building work shall include any other earthwork, not mentioned, but necessary to complete the building work.

Attention is directed to the Materials Information Handout for information regarding foundation recommendations and reports that were prepared for use during the design of this project.

Remedial Treatment.--Treatment of existing soil is required prior to construction of building foundations. Remedial treatment shall consist of removal of 1 m of existing material below bottom of concrete floor slab, slabs on grade, and footing bottom elevations. The excavated areas shall be scarified, moisture conditioned and recompacted to 95% relative compaction (RC). The limits of excavation and remediation shall extend a distance of 1 m outside the structure footprint.

Attention is directed to the requirements of “Field Engineering” in Division 1, “General Requirements,” of these special provisions.

QUALITY ASSURANCE

Samples.--Samples of sand, pea gravel, or crushed stone, weighing not less than 11 kg, shall be submitted to the Engineer at the jobsite for approval.

SITE CONDITIONS

Existing underground piping and conduit.--The location of existing underground piping and conduit is based on the best records available. Before beginning work, the Contractor shall accurately locate the piping and conduit involved in the work. If the location of the existing piping or conduit deviates from the location shown on the plans by more than 1.5 meters, or, if no elevations are indicated and the piping or conduit is more than 0.9 meter below grade, the cost of the additional excavation, backfill, piping or conduit, and removal and replacement of concrete, if any, will be paid for as an ordered change in accordance with the requirements specified in Section 3, "Changes in the Work," of the General Conditions.

Existing surfaced or planted areas.--Existing surfaced or planted areas that are removed, broken or damaged by the Contractor's operations shall be restored to their original condition except as otherwise shown on the plans or specified herein.

Restoration materials shall be equal to or better than the original materials. Surfacing shall be replaced to match the material thickness, grades, and finish of the adjacent surrounding surfaces.

PART 2.- PRODUCTS

BACKFILL MATERIALS

Structure backfill

Structure and trench backfill shall be free of organic and other deleterious material and shall be suitable for the required compaction. Gravel without sand matrix shall not be used except as free draining granular material beneath slabs and footings.

Select backfill

Sand.--

Sand shall be clean, washed sand, free from clay or organic material graded such that 100 percent passes the 6 mm sieve, 90 percent to 100 percent passes the 4.75 mm sieve and not more than 5 percent passes the 75 µm sieve size.

Crushed stone

Crushed stone shall be clean, washed, dry density of not less than 1522 kg/m^3, crushed stone or crushed gravel with an angular particle size not less than 3 mm or more than 13 mm.

Sieve or Screen Size	Percentage Passing
13 mm	100
9.5 mm	85-100
4.75 mm	10-30
2.36 mm	0-3

Crushed stone shall conform to the following requirements:

Test	California Test No.	Test Requirements
Durability Index	229	35 Min.

PART 3.- EXECUTION

PREPARATION & RESTORATION.--

Sawcutting.--Prior to excavation or trenching, existing surfacing shall be removed to saw cut lines, or to existing wood dividers or expansion joints, if any. The saw cut shall be to a neat line and have a depth not less than 25 mm.

Restoration.-Surfacing shall be replaced to match the thickness, grades and finish of the adjacent surrounding surfaces.

STRUCTURE EXCAVATION

General.--Unless otherwise noted, all excavation for building work shall be classified as structure excavation.

Footing excavation.--The bottom of excavations shall not be disturbed. The contractor shall excavate by hand to the final grade. The bottom of concrete footings shall be poured against undisturbed material. Unless otherwise noted, compaction of the bottom of footing excavation is not required unless the material is disturbed. The footing depths shown on the plans shall be changed to suit field conditions when directed by the Engineer. Solid rock at or near required depths shall not be disturbed. Unsuitable material shall be excavated down to firm bearing as directed by the Engineer. Work and materials required because of excavation in excess of the depths shown on the plans, when such excavation has been ordered by the Engineer, will be paid for as an ordered change in accordance with the requirements in Section 3, "Changes in the Work," of the General Conditions.

Excavate to the elevations and dimensions within a tolerance of ±12 mm. Limits of the excavation shall allow for adequate working space for installing materials and as required for safety of personnel. Such working space excavation shall be replaced in kind and compacted at the Contractor's expense.

Overdepth excavation for footings shall be backfilled with concrete or such other material recommended by the Contractor and approved by the Engineer. Relative compaction shall be not less than 95 percent.

At locations and to the limits shown on the plans, material below the bottom of the foundation or footing shall be removed and replaced with select backfill in accordance with the placing and compacting requirements for backfill.

Excavation for pipes and conduits.--Pipes or conduits in the same trench shall have a minimum clear distance between pipes or conduits of 150 mm. Pipes or conduits shall have not less than 0.75 meter of cover from top of pipes or conduits to finished grade unless otherwise shown on the plans or specified.

Trenching shall be of sufficient depth to permit placing a minimum depth of 100 mm of compacted sand under all pipes and conduits.

Excavation adjacent to trees shall be performed by hand methods where necessary to avoid injury to trees and roots. Roots 50 mm in diameter and larger shall be protected with heavy burlap. Roots smaller than 50 mm in diameter adjacent to trees shall be hand trimmed. Cuts through roots 13 mm in diameter and larger shall be sealed with tree trimmers' asphaltic emulsion. If trenches remain open more than 24 hours, the side of the trench adjacent to the tree shall be shaded with burlap and kept damp. Materials shall not be stockpiled within the drip line of trees.

Dewatering.--Excavations shall be kept clear of standing water. Water shall be removed by pumping if necessary. Water removed from excavation shall be carried away from the building site and disposed of in a manner that will not harm State or adjacent property.

STRUCTURE BACKFILLING

General.--Unless otherwise noted, all backfill for building work shall be classified as structure backfill. Backfill shall be placed and compacted in horizontal layers, not more than 150 mm thick prior to compaction, and to the lines and grades shown on the plans or to original ground.

Structure backfill.--After structures are in place and forms are removed, wood and other debris shall be removed from excavations before placing structure backfill.

Select backfill.--At the locations and to the limits shown on the plans, materials below the bottom of footings or foundations shall be removed and replaced with select backfill material in accordance with the placing requirements of structure backfill.

Backfilling pipes and conduits.--Backfill placed under pipe and conduits shall be compacted sand, 100 mm minimum depth. Backfill material placed to a level 150 mm above tops of pipes and conduits shall be sand or fine earth and particles shall not exceed 13 mm in greatest dimension. For wrapped, coated, or plastic pipe or conduits, sand shall be used for backfill. Backfill material placed higher than 150 mm above tops of pipes or conduits shall consist of material free of stones or lumps exceeding 100 mm in greatest dimension except:

(a) The top 300 mm of backfill under roads, walks or paving shall consist of aggregate base material.
(b) The top 150 mm of backfill in planted areas shall consist of topsoil.

Unless otherwise shown on the plans, pipe under roads, with less than 0.75 m of cover over the top of pipe, shall be backfilled with concrete to a level 100 mm above the top of pipe. Concrete for backfill shall be commercial quality concrete containing not less than 350 kg/m^3 of cement.

COMPACTION

General.--Relative compaction shall be determined in accordance with California Test 216 or 231.
Unless otherwise noted below, all backfill shall be compacted to a minimum relative compaction of 90 percent.
Unless approved in writing by the Engineer, compaction by jetting or ponding will not be permitted.

Compact original ground.--Original ground surface under fill with surfacing of concrete and asphalt concrete shall be compacted to a relative compaction of not less than 95 percent for a minimum depth of 150 mm.

Subgrade preparation.--Preparation of subgrade material for placing aggregate base, surfacing, or slabs thereon shall include fine grading, compaction, reworking as necessary. The upper 150 mm of the subgrade shall have the same compaction as the fill to be placed over it.
The prism of backfill directly underneath the building foundation and sloping downward at 1:1 shall be compacted to 95 percent.

Structure backfill.--Structure backfill shall be compacted to not less than 95 percent relative compaction.

Select backfill.--Select backfill shall be compacted to not less than 95 percent relative compaction.
A relative compaction of not less than 95 percent shall be obtained for a minimum depth of 150 mm below the bottom of the excavation before placing select backfill.

Trench backfill.--Trench backfill placed beneath slabs or paved areas shall be compacted to a relative compaction of not less than 95 percent.

DISPOSAL

Surplus material.--Surplus material from the excavation shall be disposed of away from the premises.

FIELD QUALITY CONTROL

Inspection.--When the excavation is substantially completed to grade, the Contractor shall notify the Engineer. No concrete shall be placed until the foundation has been approved by the Engineer.

Testing.--The State will conduct compaction tests during the backfilling and compacting operations.

2.04 AGGREGATE BASE

PART 1.-GENERAL

SUMMARY

Scope.--This work shall consist of furnishing, spreading and compacting aggregate base in accordance with the details shown on the plans and these special provisions.

PART 2.-PRODUCTS

Aggregate base

Aggregate base shall be commercial quality aggregates consisting of broken stone; crushed gravel; natural, clean, rough-surfaced gravel and sand; or a combination thereof.

Aggregate base shall conform to the following grading as determined by California Test 202:

Sieve or Screen Size	Percentage Passing
25 mm	100
19 mm	90 - 100
4.75 mm	35 - 60
600 µm	10 - 30
75 µm	2 - 9

Aggregate base shall also conform to the following quality requirements:

Tests	California Test No.	Test Requirements
Durability Index	229	35 Min.
Resistance (R-Value)	301	78 Min.
Sand Equivalent	217	22 Min.

PART 3.-EXECUTION

SPREADING AND COMPACTING

Spreading.--Aggregate base shall be placed and compacted to the lines and grades shown on the plans.

Spreading and compacting shall be performed by methods that will produce a uniform base, free from pockets of coarse or fine material.

Compaction.--Relative compaction of each layer of compacted base material shall be not less than 95 percent, as determined by California Test 216 or 231.

2.05 FREE DRAINING GRANULAR MATERIAL

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of furnishing and placing free draining granular material beneath slabs in accordance with the details shown on the plans and these special provisions.

PART 2.- PRODUCTS

Free draining granular material

Free draining granular material shall be clean, hard, durable, free-draining rock. The material gradation shall be such that all passes the 25 mm screen, and not more than 10 percent passes the 4.75 mm sieve as determined by California Test 202. Granular material shall be free from organic material, clay balls or other deleterious substances.

PART 3.- EXECUTION

SPREADING AND CONSOLIDATING

General.--Free draining granular material shall be placed, spread and consolidated by tamping or vibrating.

2.06 LIFT STATION ENCLOSURE

PART 1.-GENERAL

SUMMARY

Scope.--This work shall consist of furnishing and constructing a lift station enclosure in accordance with the details shown on the plans and these special provisions.

Lift station enclosure shall consist of precast concrete manhole base and riser, cast-in-place concrete top slab access door and other work as necessary for a complete installation.

Earthwork, including excavation and backfill, shall conform to the requirements in "Earthwork for Building Work, " in Division 2 of these special provisions.

Cast-in-place concrete shall conform to the requirements for structural work in "Cast-in-Place Concrete, " in Division 3, "Concrete and Reinforcement" in these special provisions.

Bar reinforcing steel shall conform to the requirements in “Cast-in-Place Concrete,’ in Division 3, "Concrete and Reinforcement" in these special provisions.

SUBMITTALS

Product data.—Manufacturer’s descriptive data for waterproofing membrane and precast manhole base and riser sections shall be submitted for approval.

QUALITY ASSURANCE

Certificates of Compliance.--Certificates of Compliance shall be furnished for cement, reinforcement, epoxy products, and admixtures in accordance with the requirements specified in Section 4-1.04, "Certificates of Compliance," of the General Conditions.

PART 2.—PRODUCTS

Precast manhole riser section

Precast reinforced concrete manholes shall be not less than 915 mm in diameter and conform to the requirements in ASTM Designation: C 478M.

Precast manhole base section

Precast manhole base section shall be integral with sidewalls.

Waterproof membrane.--

Waterproof membrane shall be a liquid, cold applied, seamless, single component, flexible, bitumen modified polyurethane formulated for hand application by roller or airless spraying.
Properties shall be as follows:

Property	Value	Test Designation
Wet film thickness	2.5 mm, min	Wet film thickness gage
Shore A hardness	10 min	ASTM D 2240
Elongation, %	350 min	ASTM D 412
Tensile strength (kPa)	550 min	ASTM D 412
Application rate, approximate	3 liters per square meter	Inspection, wet mil thickness

Waterproof membrane shall be Rexnord Chemical Products, HLM 5000; Polycoat Products, Aquaseal-1; Select Products Company, Select Poly-Kote LM; or equal.

Epoxy mortar

Epoxy mortar shall be commercial quality, low viscosity paste polysulfide extended epoxy formulated primarily for use in bonding new portland cement concrete to old portland cement concrete.

PART 3.—EXECUTION

INSTALLATION

Precast manhole base and riser.—Ends of riser sections shall be thoroughly cleaned and wetted prior to placing epoxy mortar.

Joint in lower section shall be completely filled with mortar prior to setting next section in place. Interior surfaces of joints shall be trowelled smooth.

All joints and penetrations of manholes shall be sealed watertight with epoxy mortar.

Application of coating.—The interior surfaces of the enclosure shall be prepared and coated with waterproofing membrane in accordance with the manufacturer's recommendations.

FIELD QUALITY CONTROL

Testing.—When, in the opinion of the Engineer, the groundwater table is too low to permit visual detection of leaks, lift station enclosure shall be hydrostatically tested.

Inlets and outlets shall be plugged and the enclosure filled to the height determined by the Engineer.

Enclosure may be filled 24 hours prior to testing to permit normal absorption into the walls to take place.

Leakage in the enclosure shall not exceed 0.378 liter per hour per 305 mm of head above the invert.

Enclosures that do not meet the hydrostatic test shall be repaired or replaced.

2.07 WASH WATER SYSTEM

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of furnishing, installing and constructing a wash water system and modifying portions of existing water systems in accordance with the details shown on the plans and these special provisions.
Wash water system shall include other fittings and appurtenances, not mentioned, which are required for the complete installation and proper operation of the system.

Order of work.--Work which will curtail the use of the existing sewage system shall not be done until the facilities utilizing the system are closed and are no longer required.

SUBMITTALS

Product data.--Materials list for materials to be used shall be submitted for approval and shall include the name of the manufacturer and the source, model number, description, and standard of manufacture.
Manufacturer's descriptive data and catalog cuts to be submitted for approval are as follows:

Assist access cover
Bituminous coatings
Clarifier tank
Cleanout to grade
Flexible discharge pipe
Hose faucet
Insulating unions
Manhole
Sewer pipe
Drain pipe
Vent pipe
Water pipe
Force main pipe
Pressure washer pipe
Pipe hanger
Pipe supports
Pipe wrapping and primer
Polyethylene encasement
Underground tracer tape
Unions
Solenoid valve
Flow control valve
Gravity check valve
Valve box and covers
Float switches
Storage tank
Fiberglass interceptor grate
Steel angle frame
Lift pump

QUALITY ASSURANCE

Codes and standards.--Work shall conform to the applicable portions of the 1998 approved California Plumbing Code as amended by the applicable portions of current approved Title 24 California Building Standards Code, pertaining to the selection and installation of recycle wash water system materials and products.

PART 2.- PRODUCTS

IDENTIFICATION

Underground tracer tape

Underground tracer tape shall be permanent, bright colored, continuous printed plastic tape with copper wire or aluminum foil intended for direct burial service; not less than 50 mm wide x 0.1 mm thick; lettering shall read "CAUTION SEWER/WATER BURIED BELOW."

PIPES AND PIPE FITTINGS

General.--Provide pipes of one of the following materials, of weight and class indicated. Provide pipe fittings and accessories of same material and weight and class as pipes, with joining method as indicated.

Sewer pipe and fittings

Sewer pipe and fittings shall be polyvinyl chloride (PVC) gravity sewer plastic pipe and fittings conforming to ASTM Designation: D 3034, Standard Dimension Ratio (SDR) 35, with integral bell and bell and spigot rubber gasketed joints or conforming to ASTM Designation: D2665 with solvent welded fittings. Rubber gaskets shall conform to ASTM Designation: F 477. Stainless steel clamps with rubber boots shall not be used.

Drain pipe and fittings

Drain pipe and fittings shall be polyvinyl chloride (PVC) gravity sewer plastic pipe and fittings conforming to ASTM Designation: D 3034, Standard Dimension Ratio (SDR) 35, with integral bell and bell and spigot rubber gasketed joints or conforming to ASTM Designation: D2665 with solvent welded fittings. Rubber gaskets shall conform to ASTM Designation: F 477. Stainless steel clamps with rubber boots shall not be used.

Vent pipe and fittings

Vent pipe underground shall be plain end schedule 40 polyvinyl chloride (PVC) pipe with solvent welded fittings ASTM Designation: D 2241, Type I, Grade 1, Standard Dimension Ratio (SDR) 21, rated for 1380 kPa.
Vent pipe risers above ground and below ground shall be Schedule 40 galvanized steel pipe conforming to ASTM Designation: A 53, with 1040 kPa galvanized malleable iron banded screwed fittings and galvanized steel couplings. The weight of the zinc coating shall be not less than 90 percent of that specified in ASTM Designation: A 53.

Water pipe and fittings

Water pipe underground shall be plain end schedule 40 polyvinyl chloride (PVC) pipe with solvent welded fittings ASTM Designation: D 2241, Type I, Grade 1, Standard Dimension Ratio (SDR) 21, rated for 1380 kPa.
Water pipe risers above ground and below ground shall be Schedule 40 galvanized steel pipe conforming to ASTM Designation: A 53, with 1040 kPa galvanized malleable iron banded screwed fittings and galvanized steel couplings. The weight of the zinc coating shall be not less than 90 percent of that specified in ASTM Designation: A 53.

Force main pipe and fittings

Force main pipe and fittings shall be polyvinyl chloride (PVC) plastic pipe, Schedule 80, conforming to ASTM Designation: D 1785. Connections shall be threaded and/or slip pipe as shown on the plans.

Pressure washer pipe and fittings

Pressure washer pipe and fittings shall be as recommended by the high pressure washer manufacturer.

Sewer pipe adapters

Sewer pipe adapters for PVC to cast iron soil pipe or clay piping shall be appropriately sized PVC flexible coupling manufactured for connecting dissimilar pipes. Adapters shall be attached to piping with adjustable stainless steel band clamps with hex tightening screws. Rubber boots will not be allowed. Sewer pipe adapter shall be Indiana Seal; Fernco; or equal.

Union

Unions (for steel pipe) shall be 1730 kPa, threaded malleable iron, ground joint, brass to iron seat, galvanized or black to match piping.

Insulating union

Insulating union or flange as applicable shall be suitable for the service on which used. Connections shall be constructed such that the 2 pipes being connected are completely insulated from each other with no metal to metal contact. Insulating couplings shall not be used. Insulating union shall be F. H. Maloney; Central Plastics; EPCO; or equal.

CONCRETE TANKS

Clarifier tank

Clarifier tank shall be a precast reinforced concrete tank of the size shown on the plans. All joints shall be at the top of the tank above the normal operating water level. Sampling box shall be the depth shown on the plans and supplied by the clarifier tank manufacturer. The clarifier tank shall be listed and approved by the International Association of Plumbing and Mechanical Officials (IAPMO) and tank shall be marked accordingly.

MANHOLES AND COVERS.—

Manhole.--

Manhole sections and cones and grade rings shall be precast, reinforced concrete, conforming to ASTM Designation: C 478M or precast reinforced concrete pipe conforming to ASTM Designation: C 76.

Manhole frame and cover.--

Manhole frame and cover shall be gray cast iron conforming to ASTM Designation: A 48, Class 30B or greater (traffic type). Cover shall be no bolt, gas tight, closed pick hole and shall be factory marked "SS," "SEWER," or "SANITARY SEWER." The bearing surfaces of frames and covers shall be machined, and the cover shall seat firmly into the frame without rocking or sliding. Gray iron castings shall be true to pattern in form, dimensions and thickness; shall be free of surface defects; and shall be free from visible, x-ray, and machine operation defects which would affect the service value of the castings. Castings shall be matched sets in appearance, and lettering and sizing as shown on the plans.

Traffic frame and cover.--

Traffic frame and cover shall be square, heavy duty type manhole with bottom flanged frame and solid cover. Frame and cover shall be asphalt coated, ductile iron castings conforming to ASTM Designation: A 536, Grade 60-40-18. Cover shall have lifting handles and 2 corrosion resistant, countersunk bolts located in opposite sides of the cover.

Galvanized checker plate manhole cover.--

Galvanized checker plate manhole cover shall be premanufactured or fabricated, traffic rated. Manhole cover shall be commercial quality steel with standard raised pattern fabricated and sized with all necessary bearing members included, such as cross and truss bars that are required to achieve the traffic rating.

Metal shall be hot-dipped galvanized after fabrication. Cover shall conform to the requirements specified under "Building Miscellaneous Metals" in Division 5, "Metals," of these specifications.

Meter box.--

Meter boxshall be precast concrete meter box and cast iron cover with no holes. Cover shall be traffic rated, factory marked "SEWER," "SS," or "SANITARY SEWER." Meter box shall be Bes Concrete Products, Christy Concrete Products, Cook Concrete Products, or equal with extensions as required by plan dimension. Nominal inside dimensions shall be as shown on the plans.

Assist access cover

The assist access cover shall be H-20 rated, single leaf, hinged with heavy duty pneumatic and/or spring assist for end user lifting force of 11 kg.

The cover and frame shall be constructed of aluminum.

Material shall be 6061-T6 aluminum for bars, angle and extrusions. A minimum 6 mm diamond plate shall be 5086 aluminum.

The cover shall be equipped with an aluminum hold open arm. Door shall lock open in the 90 degree position. The hold open arm shall be fastened to the frame with a 13 mm grade 316 stainless steel bolt.

Hinges shall be heavy duty design. Material shall be a brass alloy with a 448 MPa tensile strength. Each hinge shall have a 10 mm grade 316 stainless steel pin. Hinges shall be bolted to the angle frame and diamond plate with 316 stainless steel bolts and Ny-Lock nuts.

Aluminum shall be mill finish. Exterior of frame shall have a minimum of one coat of bituminous paint.

Each cover shall be supplied with a stainless steel Lev-L-Lock. The Lev-L-Lock shall be fastened with grade 316 stainless steel bolts and washers.

Each cover shall be equipped with a stainless steel lift handle. Lift handles shall be flush with top of diamond plate.

The number of leaves and the cover and frame size shall be as shown on plans.

Lift pump-..

Lift pump with piping and components. The lift pump shall be submersible type and shall be suitable for Class 1, Division1 locations. Volute shall be constructed of stainless steel, with a stainless steel shaft, Viton o-rings and mechanical seal and polyamide impeller. Pump shall be capable of pumping 40-mm solids. The oil-filled motor shall have built in thermal protection. All piping and accessories shall be included as shown on the plans.

VALVES

Ball valve

Ball valve shall be two piece, minimum 2760 kPa WOG, bronze body and chrome plated or brass ball with full size port. Valve shall be Nibco Scott, T-580; Watts, B-6000; Kitz, 56; or equal.

Check valve

Check valve shall be polyvinyl chloride (PVC), socket by socket, full flow design, nonmetallic parts, designed for vertical usage, pressure rated to 860 kPa, Buna-N seal and shielded clapper.

Solenoid valve

Solenoid valves shall be Type 1, General Purpose, 120-volt, 60-hertz, seal and discs of PTFE, CSA certified, UL listed. The water operating pressure differential shall be 0 to 2070 kPa. Solenoid valve shall be continuous duty cycle rated.

Gravity check valve

Gravity check valve shall be NPS 4, hub ends, polyvinyl chloride (PVC) body, rated for 860 kPa minimum back pressure, no metallic parts, angled viton compound rubber or fluorocarbon compound seat and removable flapper rated for horizontal or vertical usage, unseated pressure opens on contact, full flow design. Valve shall be Flo Control Inc., R and G Sloane, NDS Inc., or equal.

CLEANOUTS

Cleanout to grade

Cleanout piping shall terminate with an appropriately sized flexible PVC access cap and stainless steel band coupler with hex tightening screw. Rubber coupling or cap will not be allowed. Access cap shall be Indiana Seal; Fernco; or equal.

HYDRANTS

Freezeless hydrant.--

Freezeless hydrant shall have the shut off valve seat below frost grade depth, NPS 1 1/4 one piece corrosion resistant brass casting valve body, brass plunger, rubber seal, galvanized lever with spring adjustment to hold fully open in vertical or fully closed in horizontal positioning, rated 825 kPa minimum, brass weep drain hole connectors and lavender coating color No. 11630 from the Federal Standards Color Chart No. 5959a. Coating over tee, handle and pipe column shall be high solids epoxy enamel over primer. Other components and burying depth as shown on the plans.

Hose faucet.--

Hose faucet shall be compression type, angle pattern, wall flange at exterior locations, tee handle, NPS 3/4 female thread with hose end, rough chrome or nickel plated finish for locations inside building, rough brass finish for others. Hose faucet shall be supplied with an integral or nonremovable threaded outlet vacuum breaker which meets the requirements of the American Society of Sanitary Engineering (ASSE) Standard: 1011. Hose faucet shall be Nibco, No. 63VB; Chicago, No. 13T; or equal.

Float switches

Float switches shall be 120-volt, 10-ampere, normally open, single pole, single throw (SPST), mercury-activated float switches with activation/deactivation range of no more than 50 mm. Switch enclosure shall be leak-proof, shockproof, and corrosion resistant and suitable for use in sewage type application. Float switch shall be provided with two-piece, screwed on type corrosion resistant external weight and sufficient length of cable to run from the switch location in the pump sump to the junction box without splices.

The float switches for the storage tank shall be supplied by the evaporator manufacturer.

COATINGS.—

Bituminous coating.--

Bituminous coating shall conform to ASTM Designation: D 41.

MISCELLANEOUS MATERIALS

Storage tank

Storage tank shall be constructed of polyethylene with a fiberglass casing. Size shall be as shown on the plans. Tank shall be equipped with the following: seismic bolt down anchors; removable lid; and clear PVC site gauge, connected to the tank with unions and ball valves.

Sight gauge tubing and fittings shall be transparent in color polyvinyl chloride (PVC), superior resistance to fuel, oils and solvents and pressure rated to 515-kPa. Site gauge tubing and fittings shall be supplied watertight from the manufacturer.

Interceptor grates.

Interceptor grates shall be traffic rated. Grate shall be constructed of fiberglass roving reinforced thermoset plastic produced in a one-piece mold. Color shall be green or light gray and come with an anti-slip surface. Size of grate will depend on manufacturer, but shall not exceed 0.30 x 1.22 meters .Grate shall be CSI, Strongwell or equal

Steel angle frame

Steel angle frame shall be A36.

Epoxy mortar

Epoxy mortar shall be commercial quality, low viscosity paste polysulfide extended epoxy formulated primarily for use in bonding new portland cement concrete to old portland cement concrete.

Sealant

Sealant for precast concrete tank shall be closed cell expanded neoprene conforming to ASTM Designation: D 1056, Grade RE 41.

Pipe wrapping tape and primer

Pipe wrapping tape shall be pressure sensitive polyvinyl chloride or pressure sensitive polyethylene tape having nominal thickness of 0.50 mm. Wrapping tape shall be Polyken, 922; Manville, Trantex VID-20; Scotchrap, 51; or equal.

Pipe wrapping primer shall be compatible with the pipe wrapping tape used.

Pipe supports.--

Pipe supports shall consist of non-metallic or metallic construction channel framing system. Supports shall meet the requirements of Federal Specification: WW-H-171 for pipe hangers and supports. The maximum rated loads for supports shall have a minimum safety factor of 5 or the allowable stress values as set forth in Manufacturer's Standardization Society Standards MSS SP-58. Non-metallic channel framing products shall have a flame spread rating of 25 of less when tested per ASTM Designation: E-84 and be rated Class 1.

Pipe hanger (for piping supported from overhead)

Pipe hanger (for piping supported from overhead) shall be Grinnell, Model N0. 269; Super Struct, Model No. C711; or equal.

Water hose

Water hose shall be 18 mm diameter x 30 m length commercial duty rubber hose, industrial 2-layer tire cord reinforcing, resistant to oil, chemicals, abrasion, and weather, with heavy duty brass couplings and octagon head for wrench or hand use.

Water nozzle

Water nozzle shall be straight nozzle, solid brass with barrel that moves freely from full open to full closed. Barrel shall be removable for use as full flow plain hose nozzle.

PART 3.- EXECUTION

INSTALLATION OF PIPE IDENTIFICATION

General.--Continuous underground tracer tape shall be installed directly above all buried pipes and 150 mm to 200 mm below finished grade during backfilling operations. Appropriate tape shall be used for drain, sewer and water pipes.

INSTALLATION OF PIPE AND FITTINGS

General.--Pipe shall be installed upgrade unless otherwise permitted by the Engineer. Pipe slopes shall be as shown on the plans. Galvanized steel pipe for above ground air vents shall be installed vertical terminating at grades and mounted in accordance with the details shown on the plans and these special provisions.

Pipe and fittings.--Pipe and fittings shall be installed in accordance with the plans and specifications.
Lines between manholes shall be flushed as necessary to remove collected material.

Cleaning and closing pipe.--The interior of all pipe shall be cleaned before installation. All openings shall be capped or plugged as soon as the pipe is installed to prevent the entrance of any materials. The caps or plugs shall remain in place until their removal is necessary for completion of the installation.

Flushing completed systems.--All completed systems shall be flushed and blown out.

Chlorination.--All potable source water piping and facilities shall be flushed and chlorinated by disinfecting solutions as specified in the current edition of the California Plumbing Code.

Pipe sleeves.--PVC pipe sleeves shall be provided where each pipe passes through concrete floor or slab. Inside diameter of sleeves shall be at least 20 mm larger than outside diameter of pipe. Sleeves shall be installed to provide at least 10 mm space all around pipe the full depth of concrete. Space between pipes and pipe sleeves shall be silicone caulked watertight.

Securing pipe.--Pipe in the buildings shall be held in place by pipe hangers or construction channel. Material shall be compatible with the piping or neoprene isolators shall be used. Allowances shall be made for expansion and contraction. Steel pipe shall have hangers or supports every 3 m. Plastic pipe shall have hangers or supports every 1.5 m. Vertical pipes shall be supported with clamps or straps. Horizontal and vertical piping shall be securely supported and braced to prevent swaying, sagging or flexing of joints.

Wrapping and coating steel pipe.--Steel pipe buried in the ground shall be wrapped as specified herein:

1. Wrapped steel pipe shall be thoroughly cleaned and primed as recommended by the tape manufacturer.
2. Tapes shall be tightly applied with 1/2 uniform lap, free from wrinkles and voids with approved wrapping machines and experienced operators to provide not less than 1.00 mm thickness.
3. Field joints, fittings and valves for wrapped steel pipe shall be covered to provide continuous protection by puttying and double wrapping with 0.50 mm thick tape. Wrapping at joints shall extend a minimum of 150 mm over the adjacent pipe covering. Width of tape for wrapping fittings shall not exceed 50 mm. Adequate tension shall be applied so tape will conform closely to contours of fittings. Putty tape insulation compounds approved by the Engineer shall be used to fill voids and provide a smooth even surface for the application of the tape wrap.

Sewers near water pipes.--Sewers near water pipe shall be installed below, (with vertical separation of not less than 305 mm), water pipe in the same trench, in parallel trenches less than 3 m apart, or at any crossing as specified in the current edition of the California Plumbing Code.

When water pipes cross above a sewer pipe, a vertical separation of not less than 305 mm shall be maintained between the top of the sewer pipe and the bottom of the water pipe.

When water pipes cross under a sewer pipe, a vertical separation of not less than 455 mm shall be maintained between the top of the water pipe and the bottom of the sewer pipe. No sewer pipe joint shall be within 1.5 m of the water pipe.

Joint adapters.--Joints between different types of pipes shall be made only with approved standard manufactured adapters and fittings intended for that purpose as specified in these special provisions. Adapter couplings requiring polyethylene encasement shall be as shown on the plans and these special provisions.

Interior inspection.--Interiors of pipes shall be inspected to determine displacement or damage during installation or backfilling.

Damaged pipe shall be replaced.

Misaligned pipe shall be corrected prior to use.

INSTALLATION OF MISCELLANEOUS ITEMS

INSTALLATION OF STORAGE TANK

General.--The storage tank shall be installed in accordance with the plans, the manufacturer's recommendations where applicable and the most recent Uniform Building Code. Penetrations of the storage tank for connection of piping or fittings shall be watertight. Two float switches shall be installed in the storage tank with exterior mounted junction box.

INSTALLATION OF SIGHT GAUGE TUBING AND FITTINGS

General.--The sight gauge shall be installed on the storage tank in accordance with the plans, these specifications, the tank manufacturer's recommendation and sight gauge manufacturer's recommendations where applicable. The connections to the storage tank and the sight gauge tubing and fittings shall be watertight.

Installing pipe supports.-- Vent drain galvanized steel pipe supports shall be attached to existing equipment building walls with pipe supports.

INSTALLATION OF METER BOXES

General.--Manufactured meter boxes including extensions shall be installed in accordance with the plans, these specifications, code and standards and/or the manufacturer's recommendations where applicable when approved by the Engineer.

Joints and penetrations of valve boxes shall be sealed watertight, inside and outside, with epoxy mortar.

A reinforced concrete collar or slab shall be formed and cast in place around each valve box in accordance with the details shown on the plans.

Where svalve boxes or cleanouts are to be installed to grade in areas to be paved or surfaced, no individual structure shall be constructed to final grade until the paving or surfacing has been completed in the immediate area.

INSTALLING THRUST BLOCKS

General.--Cast-in-place concrete thrust blocks shall be installed at PVC pipe fittings in accordance the latest edition of the California Plumbing Code.

INSTALLATION OF CLEANOUTS

General.--Cleanouts shall be installed 90 degrees to finished grade and shall terminate in a valve or meter box as shown on the plans. A concrete pad, 455 mm long and 100 mm thick, shall be provided full width of the trench under the wye/two way cleanout tee branch. A reinforced concrete collar shall be formed and cast-in-place around each cleanout box in conformance to the details shown on the plans.

Cleanouts to grade shall be a combination of fittings as shown on the plans. Piping and fittings for 100 mm pipe shall be sewer pipe and for 75 mm and smaller shall be drain pipe. Cleanout piping shall terminate below grade in a valve box.

Where cleanouts are to be installed to grade in areas to be paved or surfaced, no individual structure shall be constructed to final grade until the paving or surfacing has been completed in the indicated area.

TAP CONNECTION

General.--Connections to existing systems shall be as shown on the plans and subject to approvals by the local agency and Engineer.

FIELD QUALITY CONTROL

General.--All pipes shall be tested for obstructions and leakage before covering. Obstructions or irregularities shall be removed or repaired.

Non pressure (Drain and sewer) pipes shall be tested for leakage for a minimum period of 4 hours by filling with water to an elevation of 1.2 m above the average invert of pipe. The system shall show no visible leaks. Drain and sewer pipe may be tested in sections with the test water progressively passed down the pipes if feasible. Water shall be released at a rate which will not create water hammer or surge in the plugged section of pipe.

Water pipes shall be tested for leakage for a minimum period of 4 hours by filling pipes with water to a pressure of 860 kPa. Provisions shall be made for release of air. Systems shall show no loss in pressure or visible leaks. The Contractor shall repair any leaks or irregularities.

Pressure washer pipe shall be tested for leakage for a minimum period of 4 hours by filling pipes with water to a pressure of 14 000 kPa. Provisions shall be made for release of air. Systems shall show no loss in pressure or visible leaks. The Contractor shall repair any leaks or irregularities.

In lieu of hydrostatic test with water, the air test method, as outlined in the Uniform Plumbing Code (UPC), "Low Pressure Air Test for Building Sewers," may be used.

The complete wash water system shall be tested for operational use, a minimum of 2 hours per day for 3 consecutive days. The system shall operate as intended by design and as approved by the Engineer. Repairs, if necessary, shall be made at the Contractor's expense.

2.08 ASPHALT CONCRETE

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of furnishing, spreading, placing and compacting asphalt concrete for asphalt concrete surfacing in accordance with the details shown on the plans and these special provisions.

Asphalt concrete shall be commercial quality, produced at a central mixing plant, 13 mm maximum, medium grade, as specified herein.

Areas to be surfaced with asphalt concrete shall be as shown on the plans.Areas to be surfaced with asphalt concrete shall include those locations where existing bituminous surfacing has been removed to facilitate the required work such as around new building footprints and utilities trenches.

QUALITY ASSURANCE

Certificates of Compliance.--Certificates of Compliance shall be furnished for asphalt concrete and asphaltic emulsion in accordance with the requirements specified in Section 4-1.04, "Certificates of Compliance," of the General Conditions.

PART 2.- PRODUCTS

MATERIALS

Asphalts

Asphalt binder for asphalt concrete shall be steam-refined paving asphalt Grade AR-4000 (asphalt graded by viscosity), conforming to the requirements in AASHTO Designation: M 226.

Asphalt emulsion for paint binder and fog seal coat shall be asphaltic emulsion Grade SS1h conforming to the requirements in AASHTO Designation: M 140.

Aggregates

Aggregate for asphalt concrete shall be commercial quality asphalt concrete aggregate, and shall have a Sand Equivalent value of 30 minimum, when determined by California Test 217.

The combined aggregate gradings for the respective asphalt concrete mixture shall conform to the following gradations when determined by California Test 202:

13 mm Maximum Grading	
Sieve Sizes	Percentage Passing
19 mm	100
13 mm	95 - 100
4.75 mm	55 - 72
600 µm	18 - 33
75 µm	4 - 8

MIXING

General.--Asphalt binder to be mixed with the aggregate shall be between 5 percent and 8 percent by weight of the dry aggregate as determined by the Engineer.

PART 3.- EXECUTION

PREPARATION

Subgrade.--Immediately prior to placing asphalt concrete thereon, the surface of the grading plane shall not vary more than 0.015 meter above or below the grade established by the Engineer.

At the time of placing the asphalt concrete material thereon, the moisture content of the subgrade shall not be more than 3 percent above or below the optimum moisture content of the subgrade material as determined by California Test 216.

Paint binder.--Paint binder shall be furnished and applied to all existing surfacing upon which asphalt concrete is to be placed, vertical surfaces against which additional asphalt concrete material is to be placed and other surfaces designated by the Engineer.

SPREADING AND COMPACTING

Spreading.--The mixture shall be spread at a temperature of not less than 121°C. Spreading shall be performed by methods that will produce an asphalt concrete surfacing of uniform smoothness and texture. Asphalt concrete shall be placed only when the atmospheric temperature is above 10°C.

Compacting.--Asphalt concrete shall be placed in one or more layers of 0.04 meter or less in compacted thickness to match the thickness as shown on the plans. The first coverage of initial or breakdown compaction shall be performed when the temperature of the mixture is not less than 121°C, and all breakdown compaction shall be completed before the temperature of the mixture drops below 93°C.

Asphalt concrete shall be thoroughly compacted with a self-propelled tandem roller, weighing not less than 7260 kg. At locations where asphalt concrete is to be placed and which are inaccessible to rolling equipment, compaction shall be obtained by hand rollers, vibrating plates, impactors or other methods approved by the Engineer.

DIVISION 3. CONCRETE AND REINFORCEMENT

3.01 CAST-IN-PLACE CONCRETE

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of constructing cast-in-place concrete facilities in accordance with the details shown on the plans and these special provisions.

Related work.--Compressive strength concrete shall conform to the requirements in "Compressive Strength Concrete," elsewhere in this Division 3.

SUBMITTALS

Product data.--Manufacturer's descriptive data for admixtures, expansion joint material, vapor barrier, hardener, and sealer shall be submitted for approval.

Descriptive data shall be delivered to the Engineer at the jobsite.

QUALITY ASSURANCE

Certificates of Compliance.--Certificates of Compliance shall be furnished for cement, reinforcement, epoxy products, and admixtures in accordance with the requirements specified in Section 4-1.04, "Certificates of Compliance," of the General Conditions.

PART 2.- PRODUCTS

CONCRETE MIXES

Concrete (structural work)

Commercial quality concrete shall be proportioned to provide a workable mix suitable for the intended use; shall have not less than 350 kg/m^3 of cement; 0 to 50 mm penetration, inclusive, as determined by California Test 533.

The air content of the freshly mixed concrete shall be 6 ± 1 1/2 percent, as determined by California Test 504.

Concrete (minor work)

Commercial quality concrete for concrete curbs, sidewalks, driveways, gutter depressions, washracks, and collars shall be proportioned to provide a workable mix suitable for the intended use; shall have not less than 300 kg/m^3 of cement; 0 to 50 mm penetration, inclusive, as determined by California Test 533.

The air content of the freshly mixed concrete shall be 6 ± 1 1/2 percent, as determined by California Test 504.

CONCRETE MATERIALS

Cement

Cement shall conform to ASTM Designation: C 150, Types II, or III portland cement; or Type IP (MS) Modified cement. Type IP (MS) Modified shall conform to ASTM Designation: C 595 and shall be comprised of an intimate mixture of Type II Modified cement and not more than 20 percent of a pozzolanic material.

Aggregates

Aggregates shall be free from deleterious coatings, clay balls and other extraneous materials.

Aggregates proposed for use shall conform to the requirements for freezing and thawing shall as determined by California Test 528.

Admixtures

Admixtures used in portland cement concrete shall be included on the Department's current list of approved admixtures, and shall conform to ASTM Designation: C 494, Types A, B, D, F or G for chemical admixtures; ASTM Designation: C 260 for air-entraining admixtures; and ASTM Designation: C 618 for mineral admixtures, except loss on ignition shall not exceed 4 percent. Properties of admixtures shall be uniform in each lot.

FORM MATERIALS

Forms for exposed finish concrete

Forms for exposed surfaces shall be plywood, metal or other panel type materials. Plywood shall be not less than 16 mm thick and without scars, dents, and delaminations. Forms shall be furnished in largest practical pieces to minimize number of joints.

Plywood shall conform to the requirements of U. S. Product Standard PS-1 for Exterior B-B (Concrete Form) Class I.

Forms for edges of slabs shall be nominal 50 mm solid stock lumber, plywood, or metal forms.

Form ties

Form ties shall be factory fabricated, removable or snapoff metal ties for use as necessary to prevent spreading of forms during concrete placement.

Form oil

Form oil shall be commercial quality form oil which will permit the ready release of the forms and will not discolor the concrete.

REINFORCING MATERIALS

Bar reinforcement

Bar reinforcement shall conform to ASTM Designation: A 615/A 615M, Grade 60 [420], or ASTM Designation: A 706/A 706M.

Bar supports

Bar supports for reinforcement shall be precast mortar blocks or ferrous metal chairs, spacers, metal hangers, supporting wires, and other approved devices of sufficient strength to resist crushing under applied loads.

Sand

Sand for use in epoxy mortars shall be clean and shall have a moisture content of not more than 0.50-percent when tested in accordance with California Test 226.

Sand for epoxy mortar surface treatment shall be graded such that 100-percent passes the 150 µm sieve.

RELATED MATERIALS

Anchor bolts, nuts, and washers.--

Nonheaded anchor bolts shall conform to ASTM Designation: A 36/A 36M, with a minimum hook length of 6.2 diameters.

Threaded rods shall conform to ASTM Designation: A 572.

Nuts shall conform to ASTM Designation: A 563M, Grade A.

Washers for anchor bolts shall be commercial quality.

Expansion joint material

Expansion joint material shall be commercial quality asphalt impregnated pressed fiber sheets, 13 mm minimum thickness.

Keyed construction joint forms

Keyed construction joint forms shall be commercial quality, galvanized metal or plastic, factory fabricated construction joint forms. Forms shall produce a rabbeted key type joint.

Mortar

Mortar shall consist of one part cement to 2 parts clean sand and only enough water to permit placing and packing.

Curing compound

Curing compound shall be a non-pigmented curing compound with fugitive dye conforming to the requirements of ASTM Designation: C 309, Type 1-D, Class A.

ADMIXTURES

General.--Admixtures shall be used when specified or ordered by the Engineer and may be used at the Contractor's option to conserve cement or to facilitate any construction operation.

Calcium chloride shall not be used in any concrete.

Admixtures shall be combined with concrete materials by methods that produce uniform properties throughout the concrete.

If more than one admixture is used, said admixtures shall be compatible with each other so that the desirable effects of all admixtures will be realized.

Mineral admixtures may be used to replace up to 15 percent of Type II portland cement provided the weight of mineral admixture used is not less than the weight of cement replaced. Mineral admixtures shall not be used to replace Type IP (MS) Modified or Type III cements. Chemical admixtures may be used to reduce up to 5 percent of the portland cement except that the cement content shall not be less than 300 kg/m^3. When both chemical and mineral admixtures are used with Type II cement, the weight of cement replaced by mineral admixture may be considered as cement in determining the resulting cement content.

Mineral admixtures will be required in the manufacture of concrete containing aggregates that are determined to be "deleterious" or "potentially deleterious" when tested in accordance with ASTM Designation: C 289. The use of mineral admixture in such concrete shall conform to the requirements in this section except that the use of set retarding admixtures will not be permitted.

When the use of a chemical admixture is specified or is ordered by the Engineer, the admixture shall be used at the rate specified or ordered. If no rate is specified or ordered, or if the Contractor uses a chemical admixture for his own convenience, the admixture shall be used at the dosage normally recommended by the admixture manufacturer.

When air-entrainment is specified or is ordered by the Engineer, the air-entraining admixture shall be used in amounts to produce concrete having the specified or ordered air content as determined by California Test 504. If the Contractor uses air-entrainment for his own convenience, the average air content shall not exceed 4 percent and no single test shall exceed 5 1/2 percent.

Chemical admixtures and air-entraining admixtures shall be dispensed in liquid form. Dispensers shall have sufficient capacity to measure at one time the total quantity required for each batch. If more than one liquid admixture is used in the concrete, a separate measuring unit shall be provided for each liquid admixture and dispensing shall be such that the admixtures are not mixed at high concentrations. When air-entraining admixtures are used with other liquid admixtures, the air-entraining admixtures shall be the first to be incorporated into the mix. Unless liquid admixtures are added to premeasured water for the batch, they shall be discharged to flow into the stream of water so that the admixtures are well dispersed throughout the batch.

BAR REINFORCING STEEL

Bending.--Reinforcing steel bars shall accurately conform to the dimensions shown on the plans.

Bars shall be bent or straightened in a manner that will not crack or break the material. Bars with kinks or improper bends shall not be used.

Hooks, bends and splices shall conform to the provisions of the Building Code Requirements for Reinforced Concrete of the American Concrete Institute.

MIXING AND TRANSPORTING CONCRETE

General.--When a truck mixer or agitator is used for transporting concrete to the delivery point, discharge shall be complete within 1 1/2 hours, or before 250 revolutions of the drum or blades, whichever comes first, after the introduction of cement to the aggregates.

The temperature of mixed concrete, immediately before placing, shall be not less than 10°C nor more than 32°C.

Truck mixers or agitator shall be equipped with electrically or mechanically actuated revolution counters by which the number of revolutions of the drum or blades may readily be verified. The counters shall be of the continuous-registering type, which accurately register the number of revolutions and shall be mounted on the truck so that the Engineer may safely and conveniently inspect them from alongside the truck. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 30°C or above, a time less than 1 1/2 hours may be required.

When non-agitating hauling equipment is used for transporting concrete to the delivery point, discharge shall be complete within one hour after the introduction of cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 30°C, or above, the time between the introduction of cement to the aggregates and discharge shall not exceed 45 minutes.

Each load of concrete for the work shall be accompanied by a trip ticket, a copy of which shall be delivered to the Engineer at the jobsite. The trip ticket shall show volume of concrete, weight of cement and aggregates, quantity of each admixture, quantity of water including water added at the jobsite, time of day the concrete is batched, and revolution counter readings on transit mix trucks at the times the truck is charged and unloaded.

PART 3.- EXECUTION

PREPARATION

Forms.--Forms shall be mortar tight, true to the dimensions, lines, and grades shown on the plans, securely fastened and supported, and of adequate rigidity to prevent distortion during placing of concrete.

Forms for exposed surfaces shall be constructed with triangular fillets not less than 19 mm x 19 mm attached so as to prevent mortar runs and to produce smooth straight chamfers at all sharp edges of the concrete.

Form fasteners shall be removable without chipping, spalling, heating or otherwise damaging the concrete surface. Form ties shall be removed to a depth of at least 25 mm below the surface of the concrete.

The inside surfaces of forms shall be cleaned of all dirt, mortar and foreign material. Forms shall be thoroughly coated with form oil prior to use.

Forms shall not be stripped until at least 40 hours after placing concrete, except soffit forms and supports shall not be released or removed until at least 10 days after placing concrete.

Anchorages and embedded items shall be placed and rigidly secured at their planned locations prior to placing concrete.

Reglets or embedded flashing shall be installed on concrete forms before the concrete is placed.

Placing reinforcing steel.--Reinforcing steel bars shall be accurately placed to the dimensions shown on the plans.

Bar reinforcement conforming to ASTM Designation: A 615/A 615M, Grade 60 [420], or A 706//A 706M shall be lapped at least 45 diameters.

Bars shall be firmly and securely held in position by means of wiring and approved bar supports. The spacing of supports and ties shall prevent displacement of the reinforcing or crushing of supports.

Tie wire shall be clear of concrete formwork and concrete surfaces.

All reinforcing steel shall be in place and inspected before concrete placement begins. Placing of bars on fresh layers of concrete will not be permitted.

Ground bar.--A continuous reinforcing steel bar shall be installed in the building foundation at the location indicated on the plans for the electrical ground bar. The use of epoxy coated reinforcing bar is not permitted. The end of the ground bar shall extend beyond the concrete surface and shall be protected from damage by construction operations.

PLACING CONCRETE

General.--Concrete shall be placed and consolidated by means of internal vibrators to form dense, homogeneous concrete free of voids and rock pockets.

Forms and subgrade shall be thoroughly moistened with water immediately before placing concrete.

Concrete shall be placed as nearly as possible to its final location and the use of vibrators for extensive shifting of the concrete will not be permitted.

Concrete shall be deposited and consolidated in a continuous operation within limits of construction joints, until the placing of the panel or section is completed.

When concrete is to be placed in large areas requiring more than two pours, concrete shall be placed in alternate long strips between construction joints and the final slab infilled.

FINISHING CONCRETE SURFACES

Finishing unformed surfaces.--Slabs shall be placed full thickness to finish elevation and leveled to screeds by use of long straightedges. The screeds shall be set to grade at approximately 1.8 meter centers. After leveling, screeds shall be removed and the surface shall be floated with wooden floats.

Type A control joint strips shall be inserted into the floated concrete so that the bottom of the top flange is flush with the finish elevation. Strips shall be standard manufactured lengths and shall be placed on an approximate straight line. The top flange of the strips shall be removed after the concrete has set and cured.

The floated surface shall be trowelled with steel trowels. Troweling shall form a dense, smooth and true finish. Walkways, pedestrian ramps, stairs and outdoor slabs for pedestrian traffic shall be given a non-slip broom finish unless a different finish is called for on the plans or in these special provisions.

The application of cement dust coat will not be permitted.

Finished surfaces of floor slabs shall not deviate more than 3 mm from the lower edge of a 3-meter long straight edge.

Finishing formed surfaces.--Formed concrete surfaces shall be finished by filling holes or depressions in the surface, repairing all rock pockets, and removing fins. All surfaces of formed concrete exposed to view shall have stains and discolorations removed, unsightly bulges removed, and all areas which do not exhibit the required smooth, even surface of uniform texture and appearance shall be sanded with power sanders or other approved abrasive means until smooth, even surfaces of uniform texture and appearance are obtained.

Cement mortar, patching and finishing materials used to finish exposed surfaces of concrete shall closely match the color of surrounding surfaces.

CURING CONCRETE

General.--Freshly placed concrete shall be protected from premature drying and excessive cold or hot temperatures.

Initial curing of floor slabs shall start as soon as free water has disappeared from the concrete surface. The concrete shall be kept continuously wet by application of water for not less than 7 days after the concrete has been placed.

Cotton mats, rugs, carpets, or sand blankets may be used as a curing medium to retain the moisture during the curing period. Curing materials that will stain or discolor concrete shall not be used on surfaces exposed to view.

Prior to placing the curing medium, the entire surface of the concrete shall be kept damp by applying water with a nozzle that so atomizes the flow that a mist and not a spray is formed, until the surface of the concrete is covered with the curing medium. At the expiration of the curing period, the concrete surfaces shall be cleared of all curing mediums.

Concrete curbs, sidewalks, collars, and gutter depressions may be cured with a curing compound.

PROTECTING CONCRETE

General.--Concrete shall not be placed on frozen or frost covered surfaces.

Concrete shall be protected from damage due to rain, freezing or inclement weather, and shall be maintained at a temperature of not less than 4°C for 72 hours. When required by the Engineer, the Contractor shall provide a written outline of his proposed methods of protecting concrete.

Vehicles, equipment, or concentrated loads weighing more than 140 kg individually and material stockpiles weighing more than 240 kg/m^2 will not be permitted on the concrete within 10 calendar days after placing.

SPECIAL TREATMENTS

Concrete hardener.--Chemical concrete hardener shall be applied to the floor surfaces shown on the plans, prior to the application of concrete sealer. Surfaces shall be clean and dry before the application of hardener.

The solution shall be applied in accordance with the manufacturer's instructions.

After the hardener has dried, the surface shall be mopped with water to remove encrusted salts.

Concrete sealer.--Concrete sealer shall be applied to the concrete surfaces designated on the plans in accordance with the manufacturer's instructions for heavy duty use. The sealer shall be applied to dry concrete surfaces.

DIVISION 4. MASONRY

4.01 CONCRETE MASONRY UNITS

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of constructing reinforced hollow concrete masonry units in accordance with the details shown on the plans and these special provisions.

Related work.--Water repellent coating shall be applied in accordance with the requirements specified under "Water Repellent Coating" in Division 7, "Thermal and Moisture Protection," of these special provisions.

PERFORMANCE REQUIREMENTS

Unit Strength.—

Provide masonry units that develop the following installed compressive strengths (f'm) at 28 days:

Based on net area f'm = 10.34 MPa

SUBMITTALS

Product data.--Manufacturer’s descriptive data for each type of masonry unit, accessory, and other manufactured products shall be submitted for approval.

Samples.--Two samples of masonry units of each color and architectural finish shall be submitted for approval.

QUALITY ASSURANCE

Single source responsibility.--Exposed masonry units of uniform color and texture shall be obtained from one manufacturer for each different product required for each continuous surface or visually related surfaces.

Mortar ingredients of uniform quality, including color for exposed masonry, shall be obtained from one manufacturer for each cementitious component and from one source and producer for each aggregate.

Certificates of Compliance.--Certificate of Compliance shall be furnished for masonry units, aggregate for grout and transit mixed grout in accordance with the requirements specified in Section 4-1.04, "Certificates of Compliance," of the General Conditions.

DELIVERY, HANDLING AND STORAGE

Delivery.--Masonry materials shall be delivered to the project in an undamaged condition.

Storage and handling.--Masonry units shall be stored and handled in order to prevent deterioration or damage due to moisture, temperature changes, contamination, corrosion or other causes.

PART 2.- PRODUCTS

CONCRETE MASONRY UNITS

Concrete masonry units

Concrete masonry units shall be nominal size, color and architectural finish as shown on plans; hollow load bearing, light weight or medium weight, Grade N, Type II, conforming to ASTM Designation: C 90; standard or open ended masonry units.

Special shapes shall be provided where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.

MORTAR AND GROUT MATERIALS

Cement

Cement for mortar shall be Type II, low alkali portland cement conforming to ASTM Designation: C 150; or masonry cement conforming to ASTM Designation: C 91.

Cement for grout shall be Type II portland cement conforming to ASTM Designation: C 150 with maximum 15 percent Class N, F, or C mineral admixture conforming to ASTM Designation: C 618 except that the loss on ignition shall not exceed 4 percent; or Type IP(MS) blended hydraulic cement conforming to ASTM Designation: C 595.

Aggregate

Aggregate for mortar shall conform to ASTM Designation: C 144, except not more than 10 percent shall pass the No. 100 sieve.

Aggregate for grout shall conform to ASTM Designation: C 404, except 100 percent of the coarse aggregate shall pass the 9.5 mm sieve. Soundness loss shall not exceed 10 percent as determined by California Test 214.

Coloring for mortar

Coloring for mortar shall be chemically inert, fade resistant mineral oxide or synthetic type.

Lime

Lime shall conform to ASTM Designation: C 207, Type S.

Premixed mortar or grout

A premixed packaged blend of cement, lime, and sand, with or without color, that requires only water to prepare for use as masonry mortar or grout may be furnished. Packages of premix shall bear the manufacturer's name, brand, contents, weight, and color identification.

Transit mixed grout

Transit mixed grout shall conform to ASTM Designation: C 94, except aggregate shall be as specified herein for aggregate for grout. The minimum compressive strength shall be 17236 kPa at 28 days when tested in accordance with ASTM Designation: C 39. Admixtures, if used, shall conform to ASTM Designation: C 494, Types A, E or F and shall not contain chlorides.

REINFORCEMENT, TIES AND ANCHORING DEVICES

Bar reinforcement

Bar reinforcement shall conform to ASTM Designation: A 615/A 615 M, Grade 60 [420], or ASTM Designation: A 706/A 706 M.

Anchor bolts

Anchor bolts shall conform to ASTM Designation: A 36/A 6M with a minimum hook length of 6.2 diameters, and shall be 12 mm diameter unless otherwise shown on the plans.

Anchors, ties, angles, and metal lath

Anchors, ties, angles, and metal lath shall be commercial quality, and shall be galvanized.

Dry pack

Dry pack to set items into masonry shall be one part portland cement to not over 3 parts of clean sand and with a minimum amount of water for hydration and packing.

PROPORTIONING MORTAR AND GROUT

General.--Mortar shall be proportioned by loose volume and shall have one part cement, one quarter part of hydrated lime and 2 1/4 to 3 parts aggregate. Mortar shall be tinted with coloring to match the masonry units.

Grout, except transit mixed and packaged premix grout, shall be proportioned by loose volume and shall have one part cement, not more than 1/10 part hydrated lime, 2 1/4 to 3 parts sand aggregate, and not more than 2 parts gravel aggregate.

Aggregate shall be measured in a damp loose condition.

Grout shall be mixed with sufficient water to produce a mix consistency suitable for pumping without segregation. Slump shall not exceed 229 mm.

PART 3.- EXECUTION

CONSTRUCTION

General.--Masonry units shall be laid in running bond, except as otherwise shown on the plans.

Surfaces of metal, glass, wood, completed masonry, and other such materials exposed to view shall be protected from spillage, splatters and other deposits of cementitious materials from masonry construction. All such deposits shall be removed without damage to the materials or exposed surfaces.

Construction will comply with Section 2104 Construction of the California Building Code. Tolerances specified in Section 2104 shall be in affect unless otherwise shown on the plans.

Where fresh masonry joins concrete or masonry, the contact surfaces of existing material shall be roughened, cleaned and lightly wetted. The roughened surface shall be no smoother than a wood troweled surface. Cleaning shall remove laitance, curing compounds, debris, dirt and any substance which decreases bond to the fresh masonry.

Masonry shall not be erected when the ambient air temperature is below 5° C.

Surfaces of masonry erected when the ambient air temperature exceeds 38° C. shall be kept moist with water for a period of not less than 24 hours. Water shall be uniformly applied with a fog spray at the intervals required to keep the surfaces moist but not to exceed 3 hours unless otherwise approved by the Engineer.

All anchors, bolts, dowels, reglets and other miscellaneous items to be cast into the wall, shall be firmly secured in place before grout is poured.

Shoring for concrete masonry lintels shall remain in place a minimum of 15 days after the wall has been completed.

Laying masonry units.--Concrete masonry units shall be laid dry.

During laying of units all cells shall be kept dry in inclement weather by suitably covering incomplete walls. Wooden boards and planks shall not be used as covering materials. The covering shall extend down each side of masonry walls approximately 600 mm.

Chases shall be kept free from debris and mortar.

Bond beam units with an opening at each cross web shall be used at all horizontal reinforcing bars.

Where masonry unit cutting is necessary, all cuts shall be made with a masonry saw to neat and true lines. Blocks with excessive cracking or chipping of the finished surfaces exposed to view will not be acceptable.

Lintels.--Masonry lintels shall be as shown on the plans. Lintels shall be formed using U-shaped lintel units with reinforcing bars placed as shown on the plans. Formed-in-place lintels shall be temporarily supported.

Bar reinforcement.--Bar reinforcement shall be accurately positioned in the center of the cell and securely held in position with either wire ties or spacing devices near the ends of bars and at intervals not exceeding 192 bar diameters. Wire shall be 16-gage or heavier. Wooden, aluminum, or plastic spacing devices shall not be used. Tolerances for the placement of vertical reinforcement in walls and flexural elements shall be ± 12 mm. Tolerance for longitudinal reinforcement in walls shall be ±50 mm.

The minimum spacing for splices in vertical reinforcement for masonry walls shall be 1220 mm plus lap.

Bar reinforcement shall not be placed in the plane of mortar joints.

Mortar.--Mortar joints shall be approximately 9.5 mm wide. Units shall be laid with all head and bed joints filled solidly with mortar for the full width of masonry unit shell. Head joints shall be shoved tight. Exposed joints shall be concave, tooled smooth, unless otherwise shown on the plans.

Mortar that has been mixed more than one hour shall not be retempered.

Mortar placed in joints shall preserve the unobstructed vertical continuity of the concrete filling. Any overhanging mortar projecting more than 12 mm, or other obstruction or debris shall be removed from the inside of such cells.

GROUTING

General.--All cells shall be filled solidly with grout. All grout in the cells shall be consolidated at the time of placement by vibrating and reconsolidated after excess moisture has been absorbed but before plasticity is lost. Slicing with a trowel is not acceptable.

Masonry units may be placed full height of the masonry work before grouting, or they may be placed in increments for individual grout pours.

Cleanouts shall be provided for all grout pours over 1524 mm in height. Such cleanouts shall be provided in the bottom course at every cell containing vertical reinforcement. After cell inspection, the cleanouts shall be sealed before filling with grout.

Masonry units shall be placed full height of the grout pour. Grout shall be placed in a continuous pour in grout lifts not exceeding 1828 mm. The interruption between placing successive lifts of grout shall be not more than one hour.

Between grout pours, a horizontal construction joint shall be formed by stopping the grout a minimum of 38 mm below the top of the last course, except if the joint is at a bond beam, it shall be 12 mm below the top of the bond beam unit, or at the top of the wall.

CLEANING AND PROTECTING MASONRY

General.--Splashes, stains or spots on the faces of the masonry exposed to view shall be removed.

Completed masonry shall be protected from freezing for a period of at least 5 days.

DIVISION 5. METALS

5.01 STRUCTURAL STEEL FOR BUILDINGS

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of fabricating, assembling, furnishing and erecting structural steel in accordance with the details shown on the plans and these special provisions.

Structural steel consists of, shapes and hollow structural sections .

Source quality control.--Materials and fabrication procedures are subject to inspection and tests in mill, shop and field, conducted by the Engineer or a qualified inspection agency. The Contractor or fabricator shall provide access to the Engineer or testing agency to places where the structural steel work is being fabricated or produced so that the required inspection and testing can be accomplished. Such inspections and tests will not relieve the Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements. The testing agency may inspect the structural steel at the plant before shipment; however, the Engineer reserves the right, at any time before final acceptance to reject the material that does not conform to the contract requirements.

REFERENCES

General.--Structural steel shall be fabricated, assembled and erected in accordance with American Institute of Steel Construction (AISC), "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings."

Welding shall be in accordance with American Welding Society (AWS) D1.1, "Structural Welding Code - Steel."

SUBMITTALS

Product data.--Product data for items to be incorporated into the work, including structural steel, high strength bolts, nuts and washers and alternative connectors, shall be submitted for approval.

Shop drawings.--Shop drawings and calculations shall be submitted for approval.

Shop drawings shall show any changes proposed in the work, details of connections and joints exposed to the weather, details for connections not dimensioned on the plans, the sequence of shop and field assembly and erection, welding sequences and procedures. If required, the location of butt welded splices on a layout drawing of the entire structure, and the location and details of any temporary supports that are to be used.

Calculations and shop drawings for falsework to be used for the erection of structural steel shall be submitted for approval. The falsework shall be designed and constructed to provide the necessary rigidity and to support loads which will be applied. Shop drawings and design calculations shall be stamped and signed by an engineer who is registered as a Civil or Structural Engineer in the State of California. The expiration date of the registration shall be shown.

CLOSEOUT SUBMITTALS

Final drawings.--At the completion of each building on the contract, one set of reduced prints on 27 kg (minimum) bond paper, 280 mm x 432 mm in size, of the corrected original tracings of all approved drawings for each building shall be furnished to the Engineer. An index prepared specifically for the drawings for each building containing sheet numbers and titles shall be included on the first reduced print in the set for each building. Reduced prints for each building shall be arranged in the order of drawing numbers shown in the index.

The edge of the corrected original tracing image shall be clearly visible and visually parallel with the edges of the page. A clear, legible symbol shall be provided on the upper left side of each page to show the amount of reduction and a horizontal and vertical scale shall be provided on each reduced print to facilitate enlargement to original scale.

QUALITY ASSURANCE

Qualifications for welding.--A certified copy of qualification test record for welders shall be submitted to the Engineer at the jobsite. Descriptive data for equipment for field welding structural steel, including type and electric power requirements, shall be submitted for approval.

Certificates of Compliance.--Certificate of Compliance shall be furnished for structural steel products in accordance with the requirements specified in Section 4-1.04, "Certificates of Compliance," of the General Conditions. Certificate of Compliance shall include mill test certificates for each heat number used in the work.

DELIVERY, HANDLING AND STORAGE

Structural materials shall be loaded, transported, unloaded and stored so that it is kept clean and undamaged. Material shall be stored above ground on platforms, skids, or other supports. Covers and protection shall be provided to protect the materials from corrosion.

Anchorages and anchor bolts, which are to be embedded in concrete or masonry, shall be delivered in ample time to not delay the work.

PART 2.- PRODUCTS

MATERIALS

Steel bars, plates and shapes

Steel bars, plates and shapes shall conform to ASTM Designation: A 572/A 572M, Grade 50 [345].

Pipe

Pipe shall conform to ASTM Designation: A 53, standard weight, unless otherwise shown on the plans.

Hollow structural sections

Hollow structural sections shall conform to ASTM Designation: A 500, Grade B, or A 501.

Stud connectors

Stud connectors shall conform to ASTM Designation: A 108, Grades 1018 through 1020, cold drawn, either semi- or fully killed.

Anchor bolts, nuts and washers

Nonheaded anchor bolts shall conform to ASTM Designation: A 36/A 36M, with a minimum hook length of 6.2 diameters.
Headed anchor bolts shall conform to ASTM Designation: A 307.
Nuts shall conform to ASTM Designation: A 563M, Grade A.
Washers for anchor bolts shall be commercial quality.

Machine bolts, nuts and washers

Machine bolts and nuts shall conform to ASTM Designation: A 307.
Washers for machine bolts shall be commercial quality.

High strength (HS) bolts, nuts and washers

High strength (HS) bolts, nuts and washers shall conform to ASTM Designation: A 325M or ASTM Designation: A 490M.

Inorganic zinc primer

Inorganic zinc primer shall be a waterborne inorganic zinc primer conforming to the requirements of AASHTO Designation: M 300-92 I, Type II. Inorganic zinc primer shall be listed on the qualified products list which may be obtained from the Transportation Laboratory, (916) 227-7000.

Mortar

Mortar shall consist of one part cement, measured by volume, to 2 parts clean sand and only enough water to permit placing and packing.

FABRICATION

Shop fabrication and assembly.--Workmanship and finish shall be equal to the best general practice in modern shops.

Cuts shall not deviate more than 2 mm from the intended line. Roughness, notches or gouges shall be removed.

Bearing stiffeners at points of loading shall be square with the web and shall have at least 75 percent of the stiffener in contact with the flanges.

Finished members shall be true to line, shall have square corners and smooth bends and shall be free from twists, kinks, warps, dents and open joints.

Exposed edges and ends of metal shall be dressed smooth, with no sharp edges and with corners slightly rounded.

Connections.--Abutting surfaces at connections shall be clean.

Cutting and welding at the jobsite will not be allowed except as shown on the approved drawings or specifically approved by the Engineer.

Finished holes for bolts shall be cylindrical and perpendicular to the plane of the connection. Subpunched and subdrilled holes shall be 6 mm smaller in diameter than the diameter specified for the finished hole.

Bolted Connections.--Bolts for connecting steel to steel shall be high-strength bolts, nuts, and washers conforming to ASTM Designation: A 490M, Type 1, heavy hex steel structural bolts ASTM Designation: A 325M as shown on the plans.

Holes for other work.--Holes for securing other work to structural steel and passage of other work through steel framing members shall be as shown on the approved drawings.

Threaded nuts or specialty items for securing other work to steel members shall be as shown on the approved drawings.

Holes shall be cut, drilled or punched perpendicular to metal surfaces. Holes shall not be flame cut or enlarged by burning. Holes are to be drilled in bearing plates.

SHOP PAINTING

General.--Structural steel members, except those to receive sprayed-fireproofing, shall be painted.

Surface preparation.--Surfaces of structural steel to receive inorganic zinc primer shall be blast cleaned in accordance with Steel Structures Painting Council, SSPC-SP 10, "Near-White Blast Cleaning."

Bolted connections.--Contact surfaces of high strength bolted connections and ungalvanized anchor bolt assemblies shall be blast cleaned and coated with waterborne inorganic zinc primer before assembly. The total thickness of primer on each surface shall be between 0.025 mm to 0.076 mm and may be applied in one application.

Painting.--Immediately after surface preparation, surfaces of structural steel shall receive an undercoat of waterborne inorganic zinc primer. Color shall essentially match Federal Standard 595B, No. 36373.

The manufacturer's published mixing and application instructions for inorganic zinc primer shall be followed.

PART 3.- EXECUTION

ERECTION AND ASSEMBLY

Field splices.--Field splices shall be made only at the locations shown on approved shop drawings.

The parts shall be accurately assembled in their final position as shown on the plans and in true alignment with related and adjoining work before final fastening.

All parts shall be supported adequately and at locations to provide a vibration free, rigid, and secure installation.

Bolted connections

High-Strength Bolts.--Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified. The bolt head type and head location shall be consistent within a joint.

Nuts shall be on side of member least exposed to view.

Setting bases and bearing plates.--Concrete and masonry surfaces shall be cleaned and roughened to improve bond. Bottom of base and bearing plates shall be clean.

Base plates and bearing plates for structural members shall be set on wedges or other adjusting devices.

Anchor bolts shall be wrench tightened after supported members have been positioned and plumbed.

Mortar shall be solidly packed between bearing surfaces and base or bearing plates to ensure that no voids remain. Exposed surfaces shall be finished and allowed to cure.

FIELD PAINTING

Touch-up painting.--After erection, the Contractor shall clean field welds, bolted connections, and abraded areas of shop paint and apply the same materials as applied for shop painting.

Surfaces which are scheduled to receive finish coats shall be painted with an additional prime coat and finish coats in accordance with the requirements specified for shop primed steel under "Painting" in Division 9.

QUALITY CONTROL

Testing and inspection.--Ultrasonic examination shall be performed by the Contractor on at least 50 percent of all full penetration butt-welded splices in accordance with the requirements of AWS D1.1 and these special provisions.

Welding procedures and methods shall be subject to inspection for conformance with AWS D1.1.

Butt welds shall be tested in accordance with AWS D1.1, Chapter 6, Part C, Ultrasonic Testing of Groove Welds.

Examination, reporting and disposition of tests shall be in accordance with the provisions of 6.12, AWS D1.1.

In addition to ultrasonic examinations by the Contractor, welds may be subject to inspection or non-destructive testing by the Engineer.

When additional inspection or non-destructive testing is required by the Engineer, the Contractor shall provide sufficient access facilities in the shop and at the jobsite to permit the Engineer or his agent to perform such inspection and testing.

The Contractor shall correct all deficiencies in the structural steel work which inspections and laboratory test reports have indicated to be not in compliance with these special provisions. Additional tests shall be performed by the Contractor at his expense to reconfirm any non-compliance of original work, and to show compliance of the corrected work.

5.02 METAL DECK

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of furnishing and installing structural metal deck in accordance with the details shown on the plans and these special provisions.

Metal deck includes ribbed sheet steel decking units, bent plates, accessories, fasteners and such other components, not mentioned, but required for a rigid, secure and complete installation.

REFERENCES

General.--The design, fabrication and erection of metal deck shall conform to the applicable requirements of the American Iron and Steel Institute (AISI) publication, "Specifications for the Design of Light Gauge Cold Formed Steel Structural Members," and the applicable Steel Deck Institute Design Manual and these special provisions.

Welding shall be in accordance with American Welding Society (AWS) D1.3, "Structural Welding Code - Sheet Steel."

SUBMITTALS

Product data.--Manufacturer's descriptive data for each type of deck and accessories shall be submitted for approval.

Shop drawings.--Shop drawings showing complete erection layouts, details, dimensions, deck section properties shall be submitted for approval. Drawings shall show types and gages, fastening methods, including the location, type and sequence of connections, sump pans, cut openings, surface finishes and temporary supports or bracing.

QUALITY ASSURANCE

Qualification of field welding.--Welding processes and welding operators shall be qualified in accordance with "Welder Qualification," procedures in American Welding Society (AWS) D1.3, "Structural Welding Code - Steel."

Welding decking in place is subject to inspection and testing. Defective work shall be removed and replaced with acceptable work.

Certificates of Compliance.--Certificates of Compliance shall be furnished for the metal decking in accordance with the requirements specified in Section 4-1.04, "Certificates of Compliance," of the General Conditions.

DELIVERY, HANDLING AND STORAGE

General.--Metal deck units and accessories shall be transported, stored and erected in a manner that will prevent corrosion, distortion or other damage.

Deck units shall be stored off the ground with one end elevated to provide drainage.

PART 2.- PRODUCTS

MANUFACTURERS.--Acceptable manufacturers shall be; Verco Manufacturing Co.(Type HSB); IMSA (Type B-36) or equal.

MATERIALS

Deck units

Deck units, closures and plates shall be fabricated from galvanized sheet steel conforming to ASTM Designation: A 653/A 653M, Grade 33 [230].

Galvanizing shall conform to the requirements of ASTM Designation: A 924/A 924M, G60 [Z180].

Miscellaneous steel shapes

Miscellaneous steel shapes shall conform to ASTM Designation: A 36/A 36M.

Anchor clips, vent clips, flashing, saddle plates, flexible closure strips and other accessories

Anchor clips, vent clips, flashing, saddle plates, flexible closure strips and other accessories shall be as recommended by the decking manufacturer.

FABRICATION

General.--Deck units shall be formed to span 3 or more supports, with flush, telescoped or nested 50 mm laps at ends and interlocking or nested side laps unless otherwise shown on the plans.

Deck units shall conform to the configurations, metal thickness, depth and width and section properties shown on the plans.

End bearing shall be not less than 38 mm.

Metal closure strips.--Metal closure strips for opening between deck units and other construction shall be fabricated from the same gage and material as the adjacent deck units. Strips shall be formed to provide tight-fitting closures at end of cells or flutes and sides of decking.

Cleaning.--When spray-on fireproofing is specified, the decking manufacturer shall supply decking free of amounts of oil or lubricants which would significantly impair the adhesion of the spray-on fireproofing.

PART 3.- EXECUTION

INSTALLATION

General.--Deck units and accessories shall be installed in accordance with the manufacturer's recommendations and approved drawings and these special provisions.

Units shall be placed on supporting steel framework, adjusted in place and properly aligned before being permanently fastened. Ends of units shall have positive bearing over structural supports.

Cutting and fitting shall present a neat and true appearance with exposed burrs removed. Openings through the decking shall be cut square and shall be reinforced as recommended by the decking manufacturer.

The metal deck shall not be used as a working platform before deck units are fastened in place. Supplies, equipment or other loads shall not be stored on the deck. Mechanical equipment or other loads shall not be hung from metal roof decking.

Welding.--Welding shall conform to AWS requirements (D1.1 and D1.3) and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.

Welding washers shall be used where recommended by the manufacturer.

Fastening roof deck units.--Roof deck units shall be fastened to supporting steel members as shown on the structural plans.

Fastening side laps.--Side laps of adjacent deck units shall be fastened as shown on the plans.

Field painting:--Immediately following erection, field welds, bolted connections and abraded areas shall be cleaned with a wire brush.

Galvanized surfaces shall be touched-up with galvanizing repair paint recommended by the manufacturer.

5.03 MISCELLANEOUS METAL

PART 1.-GENERAL

SUMMARY

Scope.—This work shall consist of fabricating and installing miscellaneous metal in accordance with the details shown on the plans and these special provisions. This Section includes the following:

Steel framing and supports for mechanical and electrical equipment.
Steel framing and supports for applications where framing and supports are not specified in other Sections.
Plates used in fabrication of structural steel assemblies.
Steel weld plates and angles for casting into concrete and masonry not specified in other Sections.
Structural-steel door frames.
Miscellaneous steel trim including steel angle corner guards.
Metal ladders.
Metal bollards.
Anchor bolts, steel pipe sleeves, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
Galvanized sheet steel

SUBMITTALS

Product data.--Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications.

Shop Drawings—The Contractor shall submit fabrication and installation details for metal fabrications including plans, elevations, sections, and details of metal fabrications and their connections. Anchorage and accessory items shall be shown. Provide templates for anchors and bolts specified for installation under other sections shall be provided.

Calculations.--For installed products indicated to comply with design loads, structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation shall be provided.

QUALITY ASSURANCE

Welding--Qualify procedures and personnel according to the following:

AWS D1.1, "Structural Welding Code--Steel."
AWS D1.3, "Structural Welding Code--Sheet Steel."

Inspection and tests.--Materials and fabrication procedures shall be subject to inspection and tests by the Engineer, in mill, shop and field. Such tests will not relieve the Contractor of responsibility of providing materials and fabrication procedures in compliance with specified requirements.

PROJECT CONDITIONS

Field Measurements—The Contractor shall verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.

Established Dimensions--Where field measurements cannot be made without delaying the Work, the Contractor shall establish dimensions and proceed with fabricating metal fabrications without field measurements. Wall and other contiguous

construction shall be coordinated to ensure that actual dimensions correspond to established dimensions. The Contractor shall provide allowance for trimming and fitting at site.

COORDINATION

Installation of anchorages for metal fabrications shall be coordinated. The Contractor shall furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Such items shall be delivered to the Project site in time for installation.

The Contractor shall coordinate installation of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. Such items shall be delivered to the Project site in time for installation.

PART 2.- PRODUCTS

METALS

General—The Contractor shall provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, materials without seam marks, roller marks, rolled trade names, or blemishes shall be provided.

FERROUS METALS

Steel Plates, Shapes, and Bars.--ASTM Designation: A 36/A 36M.

Rolled-Steel Floor Plate--ASTM Designation: A 786/A 786M, rolled from plate complying with ASTM Designation: A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

Steel Pipe--ASTM Designation: A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

Galvanized sheet steel. ASTM A653/A653M Grade 33. Galvanizing shall be G60 [Z180}

FASTENERS

General--Unless otherwise indicated, the Contractor shall provide Type 304stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM Designation: B 633, Class Fe/Zn 5, at exterior walls. Stainless-steel fasteners for fastening aluminum shall be provided. Fasteners shall be selected for type, grade, and class required.

Anchor Bolts—Anchor bolts shall conform to ASTM Designation: F 1554, Grade 36. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized. Threaded rods shall conform to ASTM Designation: A572, Grade 50.

Nuts--ASTM Designation: A563M, Grade A
Machine Screws--ASME Designation: B18.6.7M.
Lag Bolts--ASME Designation: B18.2.3.8M.
Plain Washers--Round, ASME Designation: B18.22M.
Lock Washers--Helical, spring type, ASME Designation: B18.21.2M.

Cast-in-Place Anchors in Concrete--Anchors shall be capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM Designation: E 488, conducted by a qualified independent testing agency.

Threaded or wedge type shall be galvanized ferrous castings, either ASTM Designation: A 47/A 47M malleable iron or ASTM Designation: A 27/A 27M cast steel. Bolts, washers, and shims shall be provided as needed. Hot-dip galvanized shall conform to ASTM Designation: A 153/A 153M.

Expansion Anchors--Anchor bolt and sleeve assembly shall have the capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM Designation: E 488, conducted by a qualified independent testing agency.

Material for Anchors in Interior Locations—Material shall be carbon-steel components zinc-plated to comply with ASTM Designation: B 633, Class Fe/Zn 5.

MISCELLANEOUS MATERIALS

Welding Rods and Bare Electrodes—The Contractor shall select according to AWS specifications for metal alloy welded.

Shop Primers--Primers shall be provided that comply with Division 9 Painting unless otherwise ispecified.The Contractor shall use primer containing pigments that make it easily distinguishable from zinc-rich primer.

Zinc-Rich Primer—Zinc-rich primer shall comply with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.

Galvanizing Repair Paint—Repair paint shall be high-zinc-dust-content paint for regalvanizing welds in steel shall comply with SSPC-Paint 20.

Bituminous Paint--Cold-applied asphalt emulsion shall comply with ASTM Designation: D 1187.

Nonshrink, Nonmetallic Grout—Grout shall be factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM Designation: C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

FABRICATION, GENERAL

Shop Assembly—The Contractor shall preassemble items in the shop to greatest extent possible. Units shall be disassembled only as necessary for shipping and handling limitations. Connections shall be used that maintain structural value of joined pieces. Units shall be clearly marked for reassembly and coordinated installation.

metals shall be cut, drilled, and punched cleanly and accurately. Burrs shall be removed and edges eased to a radius of approximately 1 mm, unless otherwise indicated. Sharp or rough areas on exposed surfaces shall be removed.

Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

Form exposed work true to line and level with accurate angles and surfaces and straight edges.

Weld corners and seams continuously to comply with the following:

Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

Obtain fusion without undercut or overlap.

Remove welding flux immediately.

At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.

Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 3.2 by 38 mm, with a minimum 150-mm embedment and 50-mm hook, not less than 200 mm from ends and corners of units and 600 mm o.c., unless otherwise indicated.

MISCELLANEOUS FRAMING AND SUPPORTS

General--Provide steel framing and supports not specified in other Sections as needed to complete the Work.

Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

Prime miscellaneous framing and supports with zinc-rich primer where indicated.

STEEL WELD PLATES AND ANGLES

Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with not less than two integrally welded steel strap anchors for embedding in concrete.

STRUCTURAL-STEEL DOOR FRAMES

Fabricate structural-steel door frames from steel shapes, plates, and bars of size and to dimensions indicated, fully welded together, with -by-38-mm steel channel stops, unless otherwise indicated. Plug-weld built-up members and continuously weld exposed joints. Secure removable stops to frame with countersunk machine screws, uniformly spaced at not more than 250 mm o.c. Reinforce frames and drill and tap as necessary to accept finish hardware. Provide with integrally welded steel strap anchors for securing door frames into adjoining concrete or masonry.

Prime exterior steel frames with zinc-rich primer.

MISCELLANEOUS STEEL TRIM

Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

Galvanize exterior miscellaneous steel trim.

METAL LADDERS

General—The Contractor shall comply with ANSI A14.3, unless otherwise indicated.
Galvanize exterior ladders including brackets and fasteners.

METAL BOLLARDS

Metal bollards shall be fabricated from Schedule 80 steel pipe.

FINISHES

General.—The Contractor shall comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Finish shall be applied to metal fabrications after assembly.

STEEL AND IRON FINISHES

Galvanizing--Hot-dip galvanize items as indicated to comply with applicable standard listed below:
ASTM Designation: A 123/A 123M,shall be used for galvanizing steel and iron products.
ASTM Designation: A 153/A 153M, shall be used for galvanizing steel and iron hardware.

Preparation for Shop Priming—The Contractor shall prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

Exteriors (SSPC Zone 1B) **and Items Indicated to Receive Zinc-Rich Primer**--SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

Interiors (SSPC Zone 1A)--SSPC-SP 3, "Power Tool Cleaning."

Shop Priming—The Contractor shall apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Priming shall comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3.- EXECUTION

PREPARATION

General.--Items in shop shall be preassembled to the greatest extent possible to minimize field splicing and assembly. Units shall be disassembled only as necessary for shipping and handling limitations. Clearly mark all units for reassembly and installation.

INSTALLATION

Cutting, Fitting, and Placement—The Contractor shall perform cutting, drilling, and fitting required for installing metal fabrications. Metal fabrications shall be set accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

Exposed connections shall be fit accurately together to form hairline joints. Connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations shall be welded. The Contractor shall not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

Field Welding—The Contractor shall comply with the following requirements:

Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
Obtain fusion without undercut or overlap.
Remove welding flux immediately.
At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

Fastening to In-Place Construction—The Contractor shall provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. The Contractor shall provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.

Temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction shall be provided.

INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

General—The Contractor shall install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

INSTALLING BEARING AND LEVELING PLATES

The Contractor shall clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

Bearing and leveling plates shall be set on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, anchor bolts shall be tightened. Wedges or shims shall not be removed but, if protruding, cut off flush with edge of bearing plate before packing with grout.

Nonshrink grout, either metallic or nonmetallic, shall be used in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations, unless otherwise indicated.

Grout shall be packed solidly between bearing surfaces and plates to ensure that no voids remain.

INSTALLING GUARD POSTS

Guard posts shall be anchored in place with concrete footings. Guard posts shall be centered and aligned in holes 75 mm above bottom of excavation. Concrete shall be placed and vibrated or tamped for consolidation. Guard posts shall be supported and braced in position until concrete has cured.

Guard posts shall be filled solidly with concrete, mounding top surface to shed water.

ADJUSTING AND CLEANING

Touchup Painting--Immediately after erection, the Contractor shall clean field welds, bolted connections, and abraded areas. Paint shall be applied uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces. Paint shall be applied by brush or spray to provide a minimum 0.05-mm dry film thickness.

Galvanized Surfaces--Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM Designation: A 780.

DIVISION 6. (BLANK)

DIVISION 7. THERMAL AND MOISTURE PROTECTION

7.01 WATER REPELLENT COATING

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of furnishing and applying water repellent coating to concrete or masonry surfaces in accordance with the details shown on the plans and these special provisions.

The water repellent coating shall be applied to all exterior concrete or masonry surfaces and exposed aggregate surfaces as shown on the plans.

SUBMITTALS

Product data.--Manufacturer's descriptive data, application instructions and general recommendations for water repellents shall be submitted for approval.

QUALITY ASSURANCE

Codes and standards.--Water repellent coatings shall comply with all rules and regulations concerning air pollution in the State of California.

Certificates of Compliance.--Certificates of Compliance shall be furnished with each shipment of water repellent coating material in accordance with the requirements specified in Section 4-1.04, "Certificates of Compliance," of the General Conditions.

PART 2.- PRODUCTS

Water repellent coating

Water repellent coating shall be clear, colorless, water-based sealer. Water repellent coating shall be Hydrozo Inc., Clear Double 7; Euclid Chemical Co., Architectural Seal VOX; Tamms Industries Co., Chemstop; or equal.

PART 3.- EXECUTION

Preparation.--All surfaces to receive water repellent coating shall be dry and cleaned by removing contaminants that block pores of the surface. Cleaning methods shall be as recommended by the water repellent manufacturer.

Application.--The water repellent solution shall be applied in accordance with the manufacturer's printed instructions
The time period between applications of water repellent coating shall be not less than 24 hours.

Protection.--Surfaces of other materials surrounding or near the surfaces to receive the water repellent coating shall be protected from overspray or spillage from the waterproofing operation. Water repellent coating applied to surfaces not intended to be waterproofed shall be removed and the surfaces restored to their original condition.

7.02 INSULATION (GENERAL)

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of furnishing and installing insulation in accordance with the details shown on the plans and these special provisions.
Insulation materials shall be as specified in these special provisions, and shall be compatible with existing or new materials incorporated in the building.

SUBMITTALS

Product data.--A list of materials, manufacturer's descriptive data, location schedule, and time schedule shall be submitted for approval.
The list of materials to be used shall include the trade name, manufacturer's name, smoke developed and flame spread classification, resistance rating and thickness for the insulation materials and accessories.

Schedules.--A location schedule and time schedule shall be submitted for approval.
The location schedule shall show where each material is to be installed.
The Contractor shall provide the Engineer at the jobsite with an accurate time schedule of the areas of the building to be insulated each day. The time schedule shall be submitted 3 working days in advance of the work.

Samples.--Samples of insulation material shall be submitted to the Engineer at the jobsite.

QUALITY ASSURANCE

Codes and standards.--All insulating materials shall be certified to comply with the California Quality Standards for Insulating Materials and shall be listed in the Department of Consumer Affairs publication "Consumer Guide and Directory of Certified Insulation Material."

DELIVERY, STORAGE AND HANDLING

General.--Insulating materials shall be delivered to the jobsite and stored in a safe dry location with labels intact and legible.

Insulating materials shall be protected from physical damage and from becoming wet or soiled.

In the event of damage, materials shall be repaired or replaced as necessary to comply with these specifications.

PART 2.- PRODUCTS (Not applicable.)

PART 3.- EXECUTION (Not applicable.)

7.03 BATT INSULATION

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of furnishing and installing batt insulation in accordance with the details shown on the plans and these special provisions.

Batt insulation shall include faced and unfaced batts in walls and ceilings, acoustical batts for sound control and exposed batt or blanket insulation for ceilings and walls.

QUALITY ASSURANCE

Laminator's qualifications.--Laminator for bonding polyethylene vapor-retarder to insulating batts shall be approved by the insulation manufacturer.

The name of the laminator shall be submitted with the Product Data.

Codes and standards.--All batt or blanket insulation, including facings such as vapor barriers, shall have a flame-spread rating not to exceed 25 and a smoke density not to exceed 450 when tested in accordance with UBC Standard No. 8-1.

The flame-spread and smoke density limitations do not apply to facings on batt insulation installed between ceiling joists, or in roof-ceiling or wall cavities, provided the facing is installed in substantial contact with the surface of the ceiling or wall finish.

PART 2.- PRODUCTS

INSULATING MATERIALS

General.--Fiberglass batts shall be thermal insulation produced by combining glass fibers with thermosetting resins to comply with ASTM Designation: C 665.

Ceiling insulation

Ceiling insulation shall be fiberglass batts with paper-laminate vapor-retarder membrane on one face. Insulation shall conform to ASTM Designation: C 665, Type II, Class C. R factor shall be as indicated on the drawings.

VAPOR-RETARDERS

Paper-laminate vapor-retarder

Paper-laminate vapor-retarder shall be kraft paper sheets laminated together with asphalt or other vapor retarding compounds, scrim reinforced at edges of sheets.

AUXILIARY INSULATION MATERIALS

Insulation tape

Insulation tape shall be as recommended by the insulation manufacturer.

Insulation adhesive

Insulation adhesive shall be the type recommended by the insulation manufacturer and complying with the requirements for fire resistance.

FABRICATION

General.--Polyethylene shall be factory laminated to fiberglass batts or blankets by an applicator approved by the manufacturer of the batts or blankets.

PART 3.- EXECUTION

INSTALLATION

General.--The vapor retarder on faced batts shall be toward the interior and shall be fastened to provide a sealed retarder. Punctures and holes in the retarder shall be repaired.

Unless otherwise shown on the plans or specified elsewhere in these special provisions, insulation shall be kept 75 mm to 100 mm clear of lighting fixtures and heat producing electrical appliances and equipment.

Installing batt type insulation.--Insulation batts shall be installed to completely fill the space between framing members. Apply a single layer of insulation of required thickness, unless otherwise shown on the plans or required to make up total thickness. Installation shall conform to the manufacturer's recommendations and these special provisions.

Overlapping joints shall be sealed with insulation adhesives as recommended by vapor retarder manufacturer's printed directions. Butt joints and fastener penetrations shall be sealed with insulation tape of the type recommended by the vapor retarder manufacturer. Joints at pipes, conduits, electrical boxes and similar items penetrating the vapor retarder shall be sealed.

7.04 RIGID ROOF INSULATION

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of furnishing and installing rigid roof insulation in accordance with the details shown on the plans and these special provisions.

SYSTEM DESCRIPTION

Rigid insulation shall include rigid insulation, underlayment, wood nailers, fasteners and such other materials, not mentioned, which are required for the complete installation of the rigid insulation system.

PERFORMANCE REQUIREMENTS

General.--Materials and installation shall be coordinated with the metal roof covering system in Division 7 of these specifications to meet the requirements for a Class 1 Factory Mutual approved assembly.

Material Compatibility.—The Contractor shall provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

SUBMITTALS

Product Data.—The Contractor shall submit product data for each type of product indicated for approval.

Shop Drawings.—The Contractor shall submit for approval insulation system including plans, sections, details, and attachment pattern to other Work.

Samples.—The Contractor shall submit a 300-by-300-mm square sample of roof insulation and fastener system for verification.

DELIVERY, STORAGE, AND HANDLING

General.--Roofing materials shall be delivered to the Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.

Roof insulation materials shall be protected from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

PROJECT CONDITIONS

Weather Limitations.—The Contractor shall proceed with installation only when existing and forecasted weather conditions permit insulation system to be installed according to manufacturer's written instructions and product warranty requirements.

Existing conditions.—The specified insulation system shall be installed over existing built-up roof that has been prepared sufficiently to accept the new materials.

PART 2.- PRODUCTS

Underlayment

Underlayment shall be building paper, Type I (No. 15) asphalt roofing felt, or rosin-sized paper as required over the prepared existing BUR.

Rigid roof insulation

Rigid roof insulation shall be composite polyisocyanurate board insulation conforming to ASTM Designation C 1289, faced with insulation board on one major surface, and Type V oriented-strand-board facer, 11 mm thick, on the other surface.

Acceptable Manufacturers shall include Johns Manville International, Inc. (Nailboard); RMAX (Nailable Base); or equal.

Insulation tape

Insulation tape shall be as recommended by the insulation manufacturer.

Bitumen

Bitumen shall conform to ASTM Designation: D 312, for Type III roofing asphalt.

Wood nailers

Wood nailers shall be Douglas fir, hem-fir or equivalent western softwood pressure treated after fabrication. Wood preservatives shall be waterborne type.

Fastener (metal decking)

Fastener (metal decking) shall be galvanized spring steel barbed clip driven through galvanized 25 mm minimum nominal diameter caps; galvanized hardened steel nail with 25 mm minimum nominal diameter head and serrated shank to provide backout resistance; or threaded self tapping screw driven through 75 mm minimum nominal diameter galvanized cap.

PART 3.-EXECUTION

Preparation.--The preparation of the deck surfaces shall conform to the manufacturer's recommendations and these special provisions.

The existing built-up roof deck surface shall be made smooth, clean and level.

Installation.--Insulation panels shall be placed in onelayer of the thickness shown on the plans.Insulation panels shall be oriented with the long side perpendicular to the direction roofing felts are to be laid. End joints between panels shall be staggered.

Insulation clips and fasteners shall resist the wind uplift classification specified for the roof covering.

Wood nailers shall be thick enough so the tops are flush with surrounding insulation. Perimeter nailers shall extend at least 50 mm beyond flanges of metal flashings or gravel stops. On roofs that are steeper than 50 mm per 305 mm, perimeter wood nailers shall be supplemented by nominal 100 mm wide wood nailers installed parallel to eaves (horizontal) at a maximum spacing of 2.4 meter. Wood nailers shall be securely fastened using at least two 16d nails to each framing member.

The insulation shall be mechanically fastened as recommended by the manufacturer to meet the requirements of the Factory Mutual Loss Prevention Data 1-28. At least one fastener per 0.2 square meter of insulation panel shall be used. Panels that are cracked or broken by the installation of the mechanical fasteners shall be replaced.

Insulation shall be laid just before application of roofing felts. Units shall be laid in parallel courses with transverse joints staggered, in moderate contact with adjoining surfaces.

Insulation panels with broken or crushed corners or edges shall be trimmed free of such defects or shall be discarded. Replacement boards less than 305 mm wide shall not be used.

Damaged insulation in the completed work shall be removed and replaced. Insulation that has been wet or is wet shall be considered damaged.

7.05 METAL ROOF AND SIDING

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of furnishing and installing manufactured metal roof and siding panels, in accordance with the details shown on the plans and these special provisions.

Metal roof and siding system shall consist of underlayment, prefinished metal roof and siding panels, gutters, downspouts, fasteners, sealants, snow guards, and accessories and components, not mentioned, which are required for a complete, securely fastened and weathertight installation.

SYSTEM DESCRIPTION.--

Design Requirements.--The roof and siding system shall conform to the wind design requirements for uplift or outward pressures in accordance with Chapter 16 of the CBC for the wind speed and exposure shown on the plans.

SUBMITTALS.--

Product Data.--Manufacturer's technical product data, installation instructions, and recommendations for each type of sheathing material shall be submitted for approval.

Product data shall include the manufacturer's name and a complete material description of all components of the metal sheathing system.

Samples.--Material samples shall include a 305 mm x 305 mm sample of the roofing and siding panels for each color to be installed and a sample of each anchor clip and fastening device.

A sample of each type of snow guard shall be submitted for approval.

Shop Drawings.--Shop drawings showing the layout and details of the roofing and siding system shall be submitted for approval.

Shop drawings shall include the shape, size, thickness, and method of attachment for each component used in the work; the layout and spacing of fasteners; details of connections and closures; and details for expansion joints and weathertight joints.

Design calculations for the fastening system of the roof and wall panels with the substrate shown on the plans shall be submitted to verify compliance with the design requirements.

Shop drawings and design calculations shall be stamped and signed by an engineer who is registered as a Civil or Structural Engineer in the State of California. The expiration date of the registration shall be shown. The Engineer's signature shall be original.

QUALITY ASSURANCE.--

Certificates of Compliance.--Certificates of compliance shall be furnished for the metal sheathing system in accordance with the requirements specified in Section 4-1.04, "Certificates of Compliance," of the General Conditions.

DELIVERY, HANDLING AND STORAGE.--

Delivery and handling.--Metal panels shall be protected against damage and discoloration.

Storage.--Metal panels shall be stored above ground, with one end elevated for drainage and protected against standing water and condensation between adjacent surfaces.

PART 2.- PRODUCTS

MATERIALS.--

SHEET MATERIALS.--

Base metal.--

Base metal shall be cold formed, 18-gage, galvanized sheet steel conforming to ASTM Designation: A 653/A 653M, Grade 33 [230] with G90 [Z275] coating, except where a higher strength is required for performance, extra smooth; or cold formed aluminum-zinc alloy-coated, commercial quality, sheet steel conforming to ASTM Designation: A 792/A 792M, Grade 40 [275] with G90 [Z275] coating, extra smooth.

Configuration.--

Metal siding system shall have symmetrically shaped trapezoidal ribs with 6 inch pitch, spaced approximately 180 mm on center. The depth of the ribs shall be approximately 38 mm.

METAL FINISHES.--

General.--Coatings shall be applied before or after forming and fabricating panels, as required for maximum coating performance capability.

Colors or color matches shall be as shown on the plans or, if not otherwise shown, shall be as selected by the Engineer from the manufacturer's standard color palette.

Fluoropolymer coating.--

Finish shall be the manufacturer's standard Kynar coating with a baked on primer (0.005 mm) and a finish coat of 0.02 mm nominal for a total dry film thickness of approximately 0.025 mm nominal.

Interior finish shall consist of a 0.004 mm epoxy primer and a backer coat.

MISCELLANEOUS METAL SHAPES.--

Flashings, gutters, and downspouts.--

Flashings, gutters, and downspouts shall be formed from the same material, gage and in the same finish as the metal roofing and siding panels.

MISCELLANEOUS MATERIALS.--

Fastener clips.--

Fastener clips shall be noncorrosive, ferrous metal fasteners as recommended by the metal panel system manufacturer to resist the design loads.

Fasteners.--

Fasteners shall be as recommended by the metal panel system manufacturer. Sheet metal screws shall not be used except to fasten trim and flashings.

Underlayment.--

Underlayment shall be as recommended by the metal panel system manufacturer, but not less than 15-pound minimum asphalt impregnated fiber glass mat roofing felt.

Self-Adhering, Polyethylene-Faced Sheet.--ASTM Designation: D 1970, 1.0 mm thick minimum, consisting of slip-resisting polyethylene-film reinforcing and top surface laminated to SBS-modified asphalt adhesive, with release-paper backing; cold applied.

Available Products:

Grace, W. R. & Co.; Grace Ice and Water Shield.
Johns Manville International, Inc.; Roof Defender.
Owens Corning; Weather Lock.

Sealant and sealant tape.--

Sealant and sealant tape shall be as recommended by the panel system manufacturer.

Closures.--

Closures shall be rubber, neoprene, closed cell plastic or prefinished metal.

FABRICATION.--

General.--Unless otherwise shown on the plans, or specified herein, roof panels shall be fabricated in continuous lengths for the length of the roof, from ridge or peak to eaves, except such length shall not exceed the manufacturer's maximum production length.

Unless otherwise shown on the plans, or specified herein, siding panels shall be fabricated in continuous lengths for the height of the structure, from eaves to sill, except such length shall not exceed the manufacturer's maximum production length.

Flashings shall be fabricated in the longest practical lengths.

Roofing and siding panels shall be factory formed. Field formed panels are not acceptable.

PART 3.- EXECUTION

INSTALLATION.--

Underlayment.--The roof and siding panels shall be installed over underlayment. Underlayment shall be laid parallel to the eaves, shingle fashion with 152 mm edge laps and 305 mm end laps and shall be fastened as recommended by the metal roofing system manufacturer.

Roof and siding panels.--The roof and siding panels shall be installed and fastened in accordance with the details shown on the plans and the approved shop drawings. Cutting and fitting shall present a neat and true appearance with exposed burrs removed. Openings through roof panels shall be cut square and shall be reinforced as recommended by the metal panel manufacturer.

Metal panels shall be adjusted in place and properly aligned for the detailed conditions before fastening. Panels shall not be warped, bowed or twisted. The surface finish on the panels shall not be cracked, blemished or otherwise damaged.

Fasteners shall not be driven through roof panels or batten covers.

Miscellaneous metal shapes.--Trim, fascia, flashings, gutters, downspouts, scuppers, caps, and other prefinished metal work shall be positioned to the correct alignment for each detailed condition. Metal work shall be securely attached to backing construction using fasteners at the spacing shown on approved shop drawings. Prefinished metal to be installed over concrete, masonry or plaster shall be back-coated with asphaltic paint as recommended by the metal roofing system manufacturer.

Metal panels, trim, gutters, and other prefinished metal that are marred, punctured, incorrectly bent, or incorrectly installed will be considered damaged and shall be replaced with undamaged units.

Gutters shall be fabricated by the metal panel system manufacturer to the shape and lengths shown on the plans. Expansion joints shall conform to the manufacturer's recommendations and to SMACNA "Architectural Sheet Metal Manual."

The metal panel system shall be installed weathertight. Closures shall be tight fitting and shall be provided at the ends of panels, at the boundary of the roof, and as indicated on the approved shop drawings.

CLEAN UP AND CLOSE OUT.--

Clean up.--Adjacent surfaces shall be protected during the roofing system installation and sealant work. Excess sealant shall be removed as the installation progresses.

Roof panels, molding, trim, and other prefinished metal surfaces shall be cleaned after installation as recommended by the manufacturer. Exposed cuts shall be touched-up with a matching durable primer and paint as recommended by the metal roofing system manufacturer.

Touch up.--Damaged paint surfaces shall be touched up by using an air dry touch up paint supplied by the metal roofing system manufacturer. Only a small brush shall be used for touching up. No spraying of touch up paint is to be performed.

Damaged units.--Panels and other components of the work which have been damaged or have deteriorated beyond successful repair shall be removed and replaced.

7.06 SEALANTS AND CAULKING

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of furnishing and applying sealants and caulking which are required for this project, but not specified elsewhere, in accordance with the details shown on the plans and these special provisions.

Related work.--Pourable polyurethane joint sealant shall conform to the requirements under “Joint Sealant” elsewhere in this Division 7.

QUALITY ASSURANCE

Certificates of Compliance.--Certificates of compliance shall be furnished for the sealants and caulking in accordance with the requirements specified in Section 4-1.04, "Certificates of Compliance," of the General Conditions.

SUBMITTALS

Product data.--Manufacturer’s descriptive data and installation instructions for all sealants shall be submitted for approval.

Samples.--Color samples of all sealants shall be submitted for approval. Unless otherwise shown on the plans, colors will be selected by the Engineer from the manufacturer’s standard colors.

PART 2.- PRODUCTS

MATERIALS

General.--All sealants, primers and accessories shall be non-staining to adjacent exposed surfaces. Products having similar applications and usage shall be of the same type and same manufacturer. Gun consistency compound shall be used unless otherwise required by the job conditions.

Acrylic sealant

Acrylic sealant shall be one compound, solvent release acrylic sealant.

Butyl sealant

Butyl sealant shall be one component, skinning type.

Silicone sealant

Silicone sealant shall be one component, low modulus building sealant. Sealant shall be tack-free in one hour, shall not sag or flow, shall be ozone resistant and capable of 100 percent extension without failure.

Joint sealant

Joint sealant shall be a two-part, non sag polysulfide base, synthetic rubber sealant formulated from liquid polysulfide polymer.

Backer rod

Backer rod shall be round, open or closed cell polyurethane. Backer rod shall be sized such that it must be compressed between 25 and 75 percent of its uncompressed diameter during installation in the joint.

Neoprene

Neoprene shall conform to the requirements of ASTM Designation: C 542.

PART 3.- EXECUTION

APPLICATION

General.--Unless otherwise shown on the plans, sealants shall be applied in accordance with the manufacturer's instructions.

Silicone sealants shall not be used in locations where painting is required.

Butyl sealants shall not be used in exterior applications, and acrylic sealants shall not be used in interior applications.

Sealants shall be applied in a continuous operation for the full length of the joint. Immediately following the application of the sealant, the sealant shall be tooled smooth using a tool similar to that used to produce concave masonry joints. Following tooling, the sealant shall remain undisturbed for not less than 48 hours.

DIVISION 8. DOORS AND WINDOWS

8.01 ROLL-UP STEEL DOOR

GENERAL.--This work shall consist of furnishing and installing manual operated, roll-up door in accordance with the details shown on the plans and these special provisions.

PERFORMANCE REQUIREMENTS.—

Structural Performance.--Provide overhead coiling doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components:

Wind Load.--Uniform pressure (velocity pressure) of 960 Pa acting inward and outward.

Impact Test for Flying Debris.--Comply with ASTM E 1996, tested according to ASTM E 1886.

SUBMITTALS.--Product descriptive data, materials list, shop drawings and installation instructions shall be submitted for approval.

Manufacturer's descriptive data shall show manufacturer's name and conformance to these special provisions for door panel construction and material thickness, curtain guide size and material thickness, counterbalance spring service life, and motor operator specifications.

Materials list shall contain all items proposed to be furnished and installed under this section of these special provisions.

Shop drawings shall show details of the door frame and track, elevations of the door design type, details of the sectional door panels, and all details required for complete installation and anchorage.

PRODUCTS.--

Curtain.--

Fabricate overhead coiling door curtain of interlocking slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

Metal.--Zinc-coated (galvanized), cold-rolled structural steel (SS) sheet; complying with ASTM A 653/A 653M, G90 (Z275) coating designation. Finish shall be one coat of factory applied baked on polyester primer and all other galvanized parts of the door shall have one coat of factory applied rust inhibitive

primer. Final finish shall be field applied in accordance with the requirements specified under "Painting," in Division 9, of these special provisions.

Insulation.--Fill slat with manufacturer's standard rigid cellular polystyrene or polyurethane-foam-type thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within metal slat faces.

Curtain guides shall be fabricated from channels and angles of galvanized steel bolted together with 10 mm diameter bolts at 762 mm maximum spacing. All mounting holes in wall angle shall be slotted to allow for heat expansion.

Brackets.--

Bracket shall be constructed of heavy steel plate and reinforced to carry full door weight, roller shaft, hood, curtain and the motorized operator. Sealed ball bearings shall be furnished at all rotating support points. Bracket shall be attached to guide wall angle with a minimum of three 13 mm diameter bolts.

Roller shaft.--

Steel pipe or welded type with internal counterbalancing spring and sized to prevent distortion of the slats and deflection greater than 0.762 mm per 0.3048 m of span. Journal shall be fitted with self-lubricating bronze bearings of permanently lubricated shielded or sealed ball bearings.

Counterbalancing spring.--

Oil-tempered, helical torsion springs spring sized to provide sufficient torque for easy operation of curtain from any position. Spring tension shall be adjustable from outside without removing the hood or skirting. Spring shall be rated for a minimum of 10,000 cycle service life.

Manual curtain operator.--

Manually operated, continuous chain driven mechanism with machine cut gears. Galvanized chain shall extend to within approximately 2 feet 610 mm of floor and be provided with a hand-chain keeper.

Hood.--

Hood shall be fabricated of galvanized sheet steel formed to fit the contour of the brackets and shall be not less than 0.76 mm (22 gage) nominal thickness, reinforced to prevent bending or sagging and to provide a rigid, quiet and vibrationless installation.

EXECUTION.—

The power operated roll-up steel door and accessories shall be installed in accordance with the manufacturer's instructions and shall operate freely without binding.

Curtain guides shall be secured, reinforced, braced and supported as necessary to prevent swaying and vibration of the door. Door shall be locked with an automatic brake and a hand-chain keeper. Locking device shall be installed on the inside of the door.

8.02 HINGED DOORS

GENERAL.--This work shall consist of furnishing and installing hinged doors and frames in accordance with the details shown on the plans and these special provisions.

SUBMITTALS.--Manufacturer's descriptive data, installation instructions for fire rated assemblies and a door schedule shall be submitted for approval. The door schedule shall include a description of the type, location and size of each door and frame.

PRODUCTS.--

Wood door.--

Wood door shall be Woodwork Institute of California (WIC) "Custom" grade flush, hollow or solid core wood doors as shown on the plans. Face shall be paint grade hardwood veneer except as otherwise shown on the plans. Doors shall bear the WIC quality grade mark or shall be accompanied by a Certificate of Compliance certifying compliance with the WIC quality specified herein. Certificates of Compliance shall be in accordance with the requirements specified in Section 4-1.04, "Certificates of Compliance," of the General Conditions.

Metal door.--

Metal door shall be flush, seamless steel door factory prepared and reinforced to receive hardware and having cold rolled stretcher leveled sheet steel face sheets not less than 1.2 mm thick (18-gage). Face sheets shall be bonded with thermosetting adhesive to rigid board honeycomb or precured foam core; or face sheets shall be welded to all parts of an assembled grid of cold formed pressed metal stiffeners and framing members located around edges, ends, openings and at all locations necessary to prevent buckling of face sheets. Seams shall be tack welded, filled and ground smooth. Bottom edge and internal stiffeners of grid type core shall have moisture vents. Welds on exposed surfaces shall be ground smooth. Louvered or glazed openings shall be provided where shown on the plans.

Where fire rated doors are required, doors shall be listed and labeled for the fire rating shown on the plans.

Door shall be cleaned and treated by the bonderized process or approved phosphatizing process and then given one factory application of metal protective rust inhibitive primer. Primer shall not contain lead type pigments.

Door louvers

Door louvers shall be inverted V-type factory primed, galvanized sheet steel louvers. Exterior door louvers shall not be removable from outside of the building. Louvers at exterior doors shall have inside mounted bronze insect screens.

Louvers shall be cleaned and treated by the bonderized process or approved phosphatizing process and then given one factory application of metal protective rust inhibitive primer. Primer shall not contain lead type pigments.

Pressed metal frame

Pressed metal frame shall be not less than 1.5 mm thick (16-gage) sheet steel with integral stop, mitered corners, face welded and ground smooth corners. Frames shall be reinforced for all hardware and shall be cleaned and treated by the bonderized process or an approved phosphatizing process and then given one factory application of metal protective rust inhibitive primer. Primer shall not contain lead type pigments.

Frames for fire rated doors shall be listed for the same rating shown on the plans for fire rated doors.

Sealants

Sealants shall be ultraviolet and ozone resistant, gun grade polysulfide or polyurethane, multicomponent, Federal Specification: TT-S-227.

EXECUTION

INSTALLATION.--Doors and frames shall be installed rigidly, securely, plumb and true and in such a manner that the doors operate freely without rubbing or binding. Clearance between frame and door shall be not more than 3 mm. The exterior frame shall be sealed weathertight.

Pressed metal frames shall be secured with clips and anchors as shown on the plans.

PAINTING.--Except for the primer application specified herein, doors and frames shall be cleaned, prepared and painted in accordance with the requirements specified under "Painting" in Division-9, "Finishes," of these special provisions.

8.03 FINISH HARDWARE

PART 1.- GENERAL

SUMMARY

This work shall consist of furnishing and installing hardware items for doors in accordance with the details shown on the plans and these special provisions.

Hardware for special doors and frames, if required, shall be as specified under "Hinged Doors" in Division 8, "Doors and Windows," of these special provisions.

Hardware assemblies shall comply with the fire code and the disabled accessibility requirements indicated on the plans and specified in these special provisions.

SUBMITTALS

Manufacturer's technical information and catalog cuts for each item of door hardware and a door hardware schedule shall be submitted for approval prior to installation.

Manufacturer's catalog cuts shall include catalog numbers, material, grade, type, size, function, design, quality and finish of hardware.

The door hardware schedule shall indicate the location and size of door opening, the door and frame material, and the size, style, finish and quantity of the hardware components required.

FINISHES.—

Hardware shall be provided with standard US metal plated finish or sprayed finish where indicated.

KEYING INSTRUCTIONS

New locks shall be compatible with the master key system of the existing facility and shall be keyed to the existing lock system in use.

Locks and cylinders shall be provided with six pin "O" cylinders and blank keys. Cylinders and blank keys shall be delivered to the Engineer for combinating of cylinders and cutting of keys.

The Contractor shall provide cylinders for use during construction. Construction cylinders shall remain in place until permanent cylinders are installed. Construction cylinders shall remain the property of the Contractor.

Key bows shall be stamped "State of California" and "Do Not Duplicate."

PART 2.- PRODUCTS

GENERAL

Door hardware equal in material, grade, type, size, function, design, quality and manufacture to that specified herein may be submitted for approval.

Butt hinges

Butt hinges shall be steel, 1 1/2-pair per door unless otherwise specified or shown on the plans. Nonremovable pins shall be provided at outswing exterior doors. Hinge size shall be 114 mm x 114 mm unless otherwise noted.

Mortise locksets

Mortise locksetsshall be steel case with 32 mm x 203 mm face plate and 70 mm backset. Door and frame preparation for mortise locksets, latchset and privacy sets shall conform to ANSI A115.1.

Lever operated lockset shall be:

Best	35H 6FW 15H
Falcon	LM521 DG
Schlage	L9453R x 06
or equal.	

Door closers

Parallel arms for closers shall be installed at outswing exterior doors. Closers shall have sprayed finish to match other hardware on door.

Door closers shall be:

LCN	4040
Norton	3501-BF
Dorma	7800
or equal.	

Kickplates

Kickplates shall be 254 mm in height x 51 mm less than door width x 1.52 mm (16-gage).

Kickplates shall be:

Builders Brass	37X
Quality	48
Trimco	K0050
or equal.	

Floor mounted stops

Floor mounted stops shall be dome type. The height of the stop shall be determined by the clearance required when a threshold is used or not used.

Stops for openings without thresholds shall be:

Builders Brass	8061
Quality	331
Trimco	1210
or equal.	

Thresholds, rain drips, door sweeps and door shoes

Thresholds, rain drips, door sweeps and door shoes shall conform to the sizes and configurations shown on plans. Thresholds at door openings with accessibility requirements shall not exceed 13 mm in height.

Threshold, rain drip, door sweep and door shoe manufacturers shall be Pemko, Reese, Zero, or equal.

Threshold bedding sealant

Threshold bedding sealant shall conform to Federal Specification: SS-C-153.

Weatherstrip and draft stop

Weatherstrip and draft stop shall conform to the sizes and shapes shown on plans. Assemblies shall be UL listed and shall be provided where shown on the plans or as specified in these special provisions.

Weatherstrip and draft stop manufacturers shall be Pemko, Reese, Zero, or equal.

PART 3.- EXECUTION

DOORS AND FRAMES.--Doors and frames shall be set square and plumb and be properly prepared before the installation of hardware.

INSTALLATION.--Hardware items shall be accurately fitted, securely applied, and adjusted and lubricated in accordance with the manufacturer's instructions. Installation shall provide proper operation without bind or excessive play.

Hinges shall be installed at equal spacing with the center of the end hinges not more than 244 mm from the top and bottom of the door. Pushplates and door pulls shall be centered 1118 mm from the finished floor. Locksets, latchsets, privacy sets and panic exit mechanisms shall be 1024 mm from the finished floor. Kickplates shall be mounted on the push side of the doors, 25 mm clear of door edges.

Thresholds shall be set in a continuous bed of sealant material.

Door controls shall be set so that the effort required to operate doors with closers shall not exceed 37.8 N maximum for exterior doors and 22.3 N maximum for interior doors. The effort required to operate fire doors may be increased above the values shown for exterior and interior doors but shall not exceed 66.7 N maximum.

Door stops located on concrete surfaces shall be fastened rigidly and securely in place with expansion anchoring devices. Door stops mounted elsewhere shall be securely attached with wood screws or expansion devices as required.

Backing shall be provided in wall framing at wall bumper locations.

The location and inscriptions for door signs and name plates shall be as shown on the plans.

Hardware, except hinges, shall be removed from surfaces to be painted before painting.

Upon completion of installation and adjustment, the Contractor shall deliver to the Engineer all dogging keys, closer valve keys, lock spanner wrenches, and other factory furnished installation aids, instructions and maintenance guides.

DIVISION 9. FINISHES

9.01 PAINTING

PART 1.- GENERAL

SUMMARY.--This work shall consist of preparing surfaces to receive coatings, and furnishing and applying coatings, in accordance with the schedules and details shown on the plans, and these special provisions.

The coatings specified in this section are in addition to any factory finishes, shop priming, or surface treatment specified elsewhere in these special provisions.

SUBMITTALS.--Manufacturer's descriptive data, a materials list, and color samples shall be submitted for approval.

Product descriptive data shall include product description, manufacturer's recommendations for product mixing, thinning, tinting, handling, site environmental requirements, product application and drying time.

Materials list shall include manufacturer's name, trade name, and product numbers for each type coating to be applied.

Color samples shall be manufacturer's color cards, approximately 50 mm x 75 mm, for each color of coating shown on the plans. Color samples for stains shall be submitted on wood of the same species, color, and texture as the wood to receive the stain.

REGULATORY REQUIREMENTS.--Coatings and applications shall conform to the rules for control of volatile organic compound emissions adopted by the air quality control district in the air basin in which the coatings are applied.

SITE ENVIRONMENTAL REQUIREMENTS.--Coatings shall not be applied when the air temperature is below 10°C (20°C for varnishes) or when the relative humidity exceeds 75 percent.

The surface to be coated shall be maintained at a minimum temperature of 7°C for a period of 24 hours prior to, and 48 hours after the application of the coating. Heating facilities shall be provided when necessary.

Continuous ventilation shall be provided during application of the coatings.

A minimum lighting level of 865 lux, measured 1 m from the surface to be coated, shall be provided while surfaces are being prepared for coatings and during coating applications.

DELIVERY, STORAGE, AND HANDLING.--Products shall be delivered to the site in sealed, labeled containers and stored in a well ventilated area at an ambient air temperature of not less than 7°C. Container labeling shall include manufacturer's name, type of coating, trade name, color designation, drying time, and instructions for tinting, mixing, and thinning.

MAINTENANCE STOCK.--Upon completion of coating work, a full 3.8 liter container of each type and color of finish coat and stain used shall be delivered to the location at the project site designated by the Engineer. Containers shall be tightly

sealed and labeled with color, texture, and room locations where used, in addition to the manufacturer's standard product label.

PART 2.- PRODUCTS

GENERAL.--The products shall be the best quality grade coatings of the specified types as regularly manufactured by nationally recognized paint and varnish manufacturers that have not less than 10 years experience in manufacturing paints and varnishes. Products that do not bear the manufacturer's identification as the best quality grade product shall not be used. Products for each coating system shall be by a single manufacturer and shall not contain lead type pigments.

Thinners, shellac, fillers, patching compounds, coloring tint, and other products required to achieve the specified finish shall be the manufacturer's best quality and shall be used as recommended.

PART 3.- EXECUTION

INSPECTION.--Surfaces to be coated at the jobsite shall be approved by the Engineer prior to the application of coatings. The Contractor shall notify the Engineer at least 3 working days prior to the application of coatings.

SURFACE PREPARATION.--Surfaces scheduled to be coated shall be prepared in accordance with the following, except that the surfaces not specified herein shall be prepared as recommended by the coating manufacturer.

GENERAL.--Hardware, cover plates, light fixture trim, and similar items shall be removed prior to preparing surfaces for coating. Following the application of the finish coating, the removed items shall be reinstalled in their original locations.

WOOD.--Oil and grease shall be removed by solvent wash. Mildew shall be removed by mildew wash. Surfaces to be coated shall be cleaned of all dirt, excess material, or filler by hand cleaning. Smooth surfaced wood shall be sanded lightly.

A sealer composed of equal parts of shellac and alcohol shall be spot applied to knots, sap, pitch, tar, creosote, and other bleeding substances.

After the application of the prime coat, all nail holes, cracks, open joints, dents, scars, and surface irregularities shall be filled, hand cleaned, and spot primed to provide smooth surfaces for the application of finish coats.

Irregularities in wood surfaces to receive a transparent stain finish shall be filled and hand cleaned after the first coat of stain has been applied. The color of the filler shall match the color of the stained wood.

Irregularities in wood surfaces to receive a clear finish shall be filled and hand cleaned before the application of coatings. The color of the filler shall match the color of the coated wood.

GALVANIZED METAL.--Oils, grease, and fabrication lubricants shall be removed by solvent wash. Surfaces shall be cleaned of remaining surface treatments by hand cleaning. New surfaces shall be roughened by hand cleaning or light abrasive blasting.

Abraded or corroded areas shall be hand cleaned and spot coated with one coat of vinyl wash pretreatment. Abraded or corroded areas on new surfaces not scheduled to be painted shall be cleaned by solvent wash, hand cleaned, and given 2 spot applications of zinc rich paint.

STEEL AND OTHER FERROUS METALS.--Oils, grease, and fabrication lubricants shall be removed by solvent wash. Dirt, water soluble chemicals, and similar surface contamination shall be removed by detergent wash or steam cleaning. Mill scale and rust shall be removed by hand cleaning or abrasive blasting.

ALUMINUM AND OTHER NON-FERROUS METALS.--Oils, grease, and fabrication lubricants shall be removed by solvent wash. Dirt, water soluble chemicals, and similar surface contamination shall be removed by detergent wash.

GYPSUM BOARD.--Holes, cracks, and other surface imperfections shall be filled with joint compound or suitable filler prior to application of coatings. Taped joints and filled areas shall be hand sanded to remove excess joint compound and filler.

CEMENT PLASTER.--New plaster shall be cured a minimum of 14 days before coating. Cracks, holes, and surface imperfections shall be filled with patching plaster and hand textured to match adjacent surfaces.

CONCRETE AND CONCRETE UNIT MASONRY.--New material shall be cured a minimum of 14 days before coating. Surface dirt and dust shall be removed by brooming, air blast, or vacuum cleaner. Oil and grease shall be removed by steam cleaning. Form release agents, weak concrete, surface laitance, dirt, and other deleterious material shall be removed by sandblasting. Cracks and voids shall be filled with cement mortar patching material.

PREVIOUSLY COATED AND SHOP PRIMED SURFACES.--Dirt, oil, grease, or other surface contaminants shall be removed by water blasting, steam cleaning, or TSP wash. Minor surface imperfections shall be filled as required for new work. Mildew shall be removed by mildew wash. Chalking paint shall be removed by hand cleaning. The surfaces of existing hard or glossy coatings shall be abraded to dull the finish by hand cleaning or light abrasive blasting. Abrasive blasting shall not be used on wood or non-ferrous metal surfaces.

Chipped, peeling, blistered, or loose coatings shall be removed by hand cleaning, water blasting, or abrasive blasting. Bare areas shall be pretreated and primed as required for new work.

DEFINITIONS

DETERGENT WASH.--Removal of dirt and water soluble chemicals by scrubbing with a solution of detergent and water, and removal of all solution and residues with clean water.

HAND CLEANING.--Removal of dirt, loose rust, mill scale, excess base material, filler, aluminum oxide, chalking paint, peeling paint, or paint which is not firmly bonded to the surfaces by using hand or powered wire brushes, hand scraping tools, power grinders, or sandpaper and removal of all loose particles and dust prior to coating.

MILDEW WASH.--Removal of mildew by scrubbing with a solution of detergent, hypochlorite-type household bleach, and warm water, and removal of all solution and residues with clean water.

ABRASIVE BLASTING.--Removal of oil, grease, form release agents, paint, dirt, rust, mill scale, efflorescence, weak concrete, or laitance, by the use of airborne abrasives, and removal of loose particles, dust, and abrasives by blasting with clean air.

Abrasives shall be limited to clean dry sand, mineral grit, steel grit, or steel shot, and shall be graded to produce satisfactory results. Unwashed beach sand containing salt or silt shall not be used.

Abrasive blasting shall conform to the requirements of SSPC-SP6-85, Commercial Blast Cleaning, as defined in the Steel Structures Painting Council Manual.

Light abrasive blasting shall conform to the requirements of SSPC-SP7-85, Brush-Off Blast Cleaning, as defined in the Steel Structures Painting Council Manual.

SOLVENT WASH.--Removal of oil, grease, wax, dirt, or other foreign matter by using solvents, such as mineral spirits or xylol, or other approved cleaning compounds.

STEAM CLEANING.--Removal of oil, grease, dirt, rust, scale, or other foreign matter by using steam generated by commercial steam cleaning equipment, from a solution of water and steam cleaning compounds, and removal of all residues and cleaning compounds with clean water.

TSP WASH.--Removal of oil, grease, dirt, paint gloss, and other foreign matter by scrubbing with a solution of trisodium phosphate and warm water, and removal of all solution and residues with clean water.

WATER BLASTING.--High pressure, low volume water stream for removing dirt, light scale, chalking or peeling paint. Water blasting equipment shall produce not less than a 13 800 MPa minimum output pressure when used. Heated water shall not exceed 66°C. If a detergent solution is used, it shall be biodegradable and shall be removed from all surfaces with clean water.

PROTECTION.--The Contractor shall provide protective devices, such as tarps, screens or covers, as necessary to prevent damage to the work and to other property or persons from all cleaning and painting operations.

Paint or paint stains on surfaces not designated to be painted shall be removed by the Contractor at his expense and the original surface restored to the satisfaction of the Engineer.

APPLICATION

GENERAL.--Coatings shall be applied in accordance with the printed instructions and at the application rates recommended by the manufacturer to achieve the dry film thickness specified in these special provisions.

Mixing, thinning and tinting shall conform to the manufacturer's printed instructions. Thinning will be allowed only when recommended by the manufacturer.

Coatings shall be applied only when surfaces are dry and properly prepared.

Cleaning and painting shall be scheduled so that dust and other contaminants from the cleaning process will not fall on wet, newly coated surfaces.

Materials required to be coated shall have coatings applied to all exposed surfaces, including the tops and bottoms of wood and metal doors, the insides of cabinets, and other surfaces not normally visible from eye level.

APPLICATION SURFACE FINISH.--Each coat shall be applied to a uniform finish. Finished surfaces shall be free of surface deviations and imperfections such as skips, cloudiness, spotting, holidays, laps, brush marks, runs, sags, curtains, ropiness, improper cutting in, overspray, drips, ridges, waves, and variations in color and texture.

Each application of a multiple application finish system shall closely resemble the final color coat, except each application shall provide enough contrast in shade to distinguish the separate applications.

WORK REQUIRED BETWEEN APPLICATIONS.--Each application of material shall be cured in accordance with the coating manufacturer's recommendations before applying the succeeding coating. Enamels and clear finishes shall be lightly sanded, dusted, and wiped clean between applications.

Stain blocking primer shall be spot applied whenever stains bleed through the previous application of a coating.

TIMING OF APPLICATIONS.--The first application of the specified coating system shall be applied prior to any deterioration of the newly prepared surface. Metal surfaces shall be prepared and prime coated the same day that cleaning of bare metal is performed. Additional prime coats shall be applied as soon as drying time of the preceding coat permits.

Metal surfaces shall be prime coated within 12 hours of application of vinyl wash pretreatment.

Shellac sealer shall be allowed to dry at least 12 hours before applying the next coat.

Drying time between applications of water borne coatings shall be at least 12 hours.

APPLICATION METHODS.--Coatings shall be applied by brush, roller or spray. Rollers shall be of a type which do not leave a stippled texture in the paint film. Extension handles for rollers shall not be greater than 2 m in length.

If spray methods are used, surface deviations and imperfections such as, overspray, thickness deviations, lap marks, and orange peel shall be considered as evidence that the work is unsatisfactory and the Contractor shall apply the remainder of the coating by brush or roller, as approved by the Engineer.

DRY FILM THICKNESS

Vinyl wash pretreatment	0.007 mm to 0.13 mm, maximum.
Bituminous paint	0.1 mm, minimum.
Epoxy polyamide primer	0.1 mm, minimum.
Aliphatic polyurethane enamel	0.05 mm, minimum.
Other primers, undercoats, sealers, and coatings	As recommended by the manufacturer.

BACKPRIMING.--The first application of the specified coating system shall be applied to all wood surfaces (face, back, edges, and ends) of wood materials that are not factory coated, immediately upon delivery to the project site, except surfaces of interior finish woodwork that adjoin concrete or masonry shall be coated with one application of alkyd exterior wood primer before installation.

When clear or stain type coatings are required on millwork, trim, or paneling, varnish, reduced 25 percent by mineral spirits, shall be used for coating the back faces.

All primed metal surfaces in contact with concrete or concrete block exterior walls shall be coated with a bituminous paint on those surfaces in contact with the wall.

PATCHES IN PREVIOUSLY COATED SURFACES.--Where patches are made on surfaces of previously coated walls or ceilings, the entire surface to corners on every side of the patch shall be coated with a minimum of one application of the finish coat.

FINISHING MECHANICAL AND ELECTRICAL COMPONENTS.--Shop primed mechanical and electrical components shall be finish coated in accordance with the coating system entitled, "Shop Primed Steel." Louvers, grilles, covers, and access panels on mechanical and electrical components shall be removed and coated separately.

Interior surfaces of air ducts which are visible through grilles or louvers shall be coated with one application of flat black enamel, to limit of the sight line.

Exposed conduit, piping, and other mechanical and electrical components visible in public areas shall be painted.

Both sides and all surfaces, including edges and back of wood mounting panels for electrical and telephone equipment shall be finish coated before installing equipment.

CLEANING.--Upon completion of all operations, the coated surfaces shall be thoroughly cleaned of dust, dirt, grease, or other unsightly materials or substances.

Surfaces marred or damaged as a result of the Contractor's operations shall be repaired, at his expense, to match the condition of the surfaces prior to the beginning of the Contractor's operations.

COATING SYSTEMS.--The surfaces to be coated shall be as shown on the plans and as specified elsewhere in these special provisions. When a coating system is not shown or specified for a surface to be finish coated, the coating system to be used shall be as specified for the substrate material. The number of applications specified for each coating system listed herein is a minimum. Additional coats shall be applied if necessary to obtain a uniform color, texture, appearance, or required dry film thickness.

SYSTEM 1- ALUMINUM AND OTHER NON-FERROUS METALS

1 pretreat coat: vinyl wash pretreatment
1 prime coat: aluminum primer
2 finish coats: acrylic, exterior enamel, semi-gloss

SYSTEM 2- CEMENT PLASTER AND CONCRETE

1 prime coat: concrete and masonry primer
2 finish coats: acrylic, exterior enamel, semi-gloss

SYSTEM 3- GALVANIZED METAL

1 pretreat coat: vinyl wash pretreatment
1 prime coat: galvanized metal primer
2 finish coats: acrylic, exterior enamel, semi-gloss

SYSTEM 4- GYPSUM BOARD

1 prime coat: PVA wall sealer
2 finish coats: acrylic, interior enamel, semi-gloss

SYSTEM 5- PREVIOUSLY COATED EXTERIOR SURFACES

1 prime coat : alkyd exterior enamel undercoat
2 finish coats: acrylic, exterior enamel, semi-gloss

SYSTEM 6- PREVIOUSLY COATED INTERIOR SURFACES

1 prime coat: alkyd interior wood primer
2 finish coats: acrylic, interior enamel, semi-gloss

SYSTEM 7- SHOP PRIMED STRUCTURAL STEEL

1 intermediate coat : as recommended by finish paint manufacturer for adhesion to specified zinc-rich primer
2 finish coats: alkyd, exterior enamel, semi-gloss

SYSTEM 8- STEEL AND OTHER FERROUS METALS

2 prime coats: red oxide ferrous metal primer
2 finish coats: alkyd, exterior enamel, semi-gloss

COLOR SCHEDULE.--Colors shall be as shown on the plans.

DIVISION 10. SPECIALTIES

10.01 LOUVERS

GENERAL.--This work consists of furnishing and installing louvers in accordance with the details shown on the plans and these special provisions.

SUBMITTALS.--Manufacturer's descriptive data and installation instructions shall be submitted for approval.

PRODUCTS

Louvers

Louvers shall be factory fabricated units of extruded aluminum alloy not less than 2 mm thick (12-gage) or galvanized steel sheet not less than 1.63 mm thick (16-gage) with standard "Z" type blades, and removable bronze 16 x 16 mesh insect screens mounted on the inside of the units.
Louvers shall have integral caulking strips and retaining beads.
The finish on louvers shall be baked on primer and fluorocarbon polymeric resin.

EXECUTION

INSTALLATION.--Louvers shall be installed in accordance with the manufacturer's instructions. The completed louver installation shall be weather tight.

10.02 FIRE EXTINGUISHERS AND CABINETS

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of furnishing and installing fire extinguishers with cabinets or mounting brackets in accordance with the details shown on the plans and these special provisions.

REFERENCES

General.--Fire Extinguishers shall conform to the requirements in California Code of Regulations, Title 19 Division 1, Chapter 3, “Portable Fire Extinguishers.”

SUBMITTALS

Product data.--Manufacturer's descriptive data and installation instructions shall be submitted for approval.

QUALITY ASSURANCE

Codes and standards.--Fire extinguishers shall be Underwriters Laboratories or Factory Mutual Laboratories approved for the type, rating and classification of extinguisher specified.

PART 2.- PRODUCTS

MANUFACTURER'S

Acceptable manufacturers,--Subject to contract compliance, manufacturers shall be J. L. Industries; Larsen's Manufacturing; Potter-Roemer; or equal.

COMPONENTS

Fire extinguisher

Fire extinguisher shall be fully charged, multi-purpose dry chemical type, with charge indicator, hose and nozzle, and attached service record tag. Fire extinguisher shall be of the capacity and type rating shown on the plans.

Mounting bracket

Mounting bracket shall be the manufacturer's standard painted, surface mounted type.

PART 3.- EXECUTION

INSTALLATION

General.--Fire extinguishers shall be installed in locations and at mounting heights shown on the plans, or if not shown, at a height of 1220 mm from the finished floor to the top of the fire extinguisher.

Fire extinguisher mounting brackets and cabinets shall be attached to structure, square and plumb, in accordance with the manufacturer's recommendations.

IDENTIFICATION

Bracket-mounted.--Extinguishers shall be identified with red letter decals spelling "FIRE EXTINGUISHER" applied to wall surface. Letter size, style and location as selected by the Engineer.

SERVICING

General.--Fire extinguishers shall be serviced, charged, and tagged not more than 5 days prior to contract acceptance.

DIVISION 11. EQUIPMENT

11.01 HIGH PRESSURE WASHER (STATIONARY)

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of furnishing and installing a stationary high pressure washer and accessories in accordance with the details shown on the plans and these special provisions.

LPG gas piping and water piping shall be furnished and installed in accordance with the requirements specified under " Pipe, Fittings and Valves " in Division 15, "Mechanical," of these special provisions.

SUBMITTALS

Product data.--Manufacturer's descriptive data for high pressure washer shall be submitted for approval.

Manufacturer's descriptive data shall include a complete description, performance data and installation instructions for the materials and accessories specified herein.

CLOSEOUT SUBMITTALS

Operation and maintenance manuals.--Prior to the completion of the contract, 3 identified copies of the operation and maintenance instructions with parts lists for the equipment specified herein shall be delivered to the Engineer at the jobsite. The instructions and parts lists shall be in a bound manual form and shall be complete and adequate for the equipment installed. Inadequate or incomplete material shall be returned. The Contractor shall resubmit adequate and complete manuals at no expense to the State.

WARRANTY

Warranties and guarantees.--Manufacturers warranties and guarantees for materials or equipment used in the work shall be delivered to the Engineer at the jobsite prior to acceptance of the contract.

PART 2.- PRODUCTS

MANUFACTURERS

Acceptable manufacturers.--Subject to compliance with the requirements, products shall be Hotsy, Landa, Whitco, or equal.

MANUFACTURED UNITS

High pressure washer

High pressure washer shall be stationary type, electric motor driven, LPG, minimum 80 percent efficient, automatic operating type washer designed for continuous operation. The washer shall have a capacity of 23 liters per minute of hot water solution heated to 49°C at 13 800 kPa. The washer burner shall be natural draft, with automatic electric ignition and flame monitoring system. Heater unit shall be factor preset to operate between 15.5°C and 49°C. The heating coil shall have an inside diameter of not less than 12 mm. The unit shall be completely housed in a steel cabinet with parts shielded from spray or splash.

Washer unit shall be equipped with a remote control unit consisting of: on/off pump motor, on/off burner and on/off soap . Remote control switches shall be in a NEMA 4 enclosure. All controls including remote operator shall be 24 volt AC. Unit shall have a timer automatic shutdown system preset for two minutes. The motor shall be 208 VAC, , 3 phase as shown on the plans.

The control panel shall display temperature and pressure gauges and shall mount the motor starter and the power disconnect breaker.

The unit shall be equipped with safety controls, safety valve, vent stack and the following accessories: 864 mm heavy duty dual lance wand with trigger control; 12.7 mm diameter by 15 meters in length, high pressure hose with 2 swivel ends rated for 24 100 kPa at 121°C; spray nozzles to allow flat, round and wide angle spray patterns at full flow at 13 800 kPa and full flow at 6 900 kPa (total 6); and a wall mounted hose reel and gun rack.

ACCESSORIES

Drum dolly

Drum dolly shall have welded steel construction with a cross braced bottom and a 50 mm continuous perimeter lip, 4 ball bearing casters with steel or semi-steel wheels. Drum dolly shall be sized to match the liquid detergent drum with a minimum capacity of 450 kg.

Vent stack

Vent stack shall be listed Class B. Vent stack shall include back draft diverter, fire stop spacer, ventilating thimble with drip cap and listed vent cap.

Hose and gun reel

Hose and gun reel shall be heavy duty assembly of steel construction with connecting hose, locking automatic ratchet, guide rollers and heavy duty spring activated hose pickup. Hose and gun reel shall have bushings, swivels, ball stops, and sized for a 15 m delivery hose. The reel shall have a baked enamel finish. Manufacturers reel mounting brackets shall be supplied with reel.

Non-emulsifying soap

Non-emulsifying soap shall be a commercially formulated, concentrated liquid that removes surface dirt, road film, and bug residue from vehicle exteriors with minimal brushing when used in conjunction with a high pressure washer. The soap shall contain no solvents, caustics, acids or phosphates. It shall work with hot or cold water, rinse easily and leave no unsightly soap film or streaks. A drum containing 208 liters of the product shall be supplied by, or approved by the manufacturer of the high pressure washer specified elsewhere in these special provisions. Product shall conform to the following:

Boiling point	>100°C
Specific Gravity	1.102
Solubility in water	100%
Evaporation rate	>1
pH	11-12

Expansion anchors

Expansion anchors shall be ICBO approved, integral stud type or internally threaded type with independent stud complete with hex nut and cut washer.

PART 3.- EXECUTION

INSTALLATION

General.--The high pressure washer shall be installed in accordance with the manufacturer's recommendations.

A reduced pressure backflow preventer shall be installed in the water line prior to the unit. Piping shall be installed to provide a minimum headroom clearance of 2.5 meters. Piping shall not be installed in travel areas at floor level.

Hose and gun reel assembly shall be attached to the wall with 6 mm (minimum) stud type expansion anchors. If hose and gun reel does not include brackets for the gun nozzle, wall brackets shall be installed at the Contractor’s expense.

Factory fittings for mixing meter shall be installed on the 208 liter drum of non-emulsified soap and placed on the drum dolly. Soap and dolly shall be ready for use and placed in the equipment building or other location as designated by the Engineer.

FIELD QUALITY CONTROL

Testing.--Testing of the high pressure washer shall be conducted by the Contractor in the presence of the Engineer. The Contractor shall notify the Engineer in writing not less than 5 days prior to the time that testing is to be conducted.

11.02 EVAPORATOR

PART 1.-GENERAL

SUMMARY

Scope.--This work shall consist of furnishing and installing an evaporator in accordance with the details shown on the plans and these special provisions.

The evaporator shall include the tank assembly, blower fan assembly, automatic fill system, burner assembly, control sensors, control panel for automatic operation, safety shutdown devices, piping, valves, vents, anchorage, and other such equipment, appurtenances and material not mentioned herein, which are required for the proper installation and operation of the evaporator.

Pipes, fittings, valves and other appurtenances shall be in accordance with the requirements specified under "Wash Water System" in Division 2 of these special provisions.

All electrical work shall be in accordance with the requirements specified in Division 16, “Electrical,” of these special provisions.

SUBMITTALS.—

Shop drawings and seismic design.--Shop drawing and seismic design calculations for the evaporator and the water storage tank shall be submitted for approval. Shop drawings shall include the tank assembly, exhaust fan assembly, automatic fill system, burner assembly, control sensors, piping valves vents, control panel schematic and wiring diagrams complete with list of electrical equipment, anchorage and appurtenances. The electrical wiring diagram shall be drawn in a conventional ladder logic manner and shall be complete with wire identification numbers.

Shop drawings for the storage tank shall include location and type of penetration fittings installed by the tank manufacturer. The drawing and calculations shall be stamped and signed by an Engineer who is registered as a Civil or Structural engineer in the State of California. The expiration date of the registration shall be shown.

ACCEPTABLE MANUFACTURERS.—

Acceptable manufacturers are Landa, RGI, or equal.

OPERATION AND MAINTENANCE MANUALS.—

Operation and maintenance manuals.--Prior to the completion of the contract, 3 identical copies of the operation and maintenance instructions complete with parts lists and electrical schematic diagram for the equipment installed at job site shall be delivered to the Engineer at the jobsite. The instruction and parts lists including electrical schematic diagram shall be indexed and bound in a manual form and shall be complete and adequate for the equipment installed. Inadequate or incomplete material shall be returned. The Contractor shall resubmit adequate and complete manuals at no expense to the State.

WARRANTIES AND GUARANTEES.—

Warranties and Guarantees.--Manufacturer's warranties and guarantees for materials or equipment used in the work shall be delivered to the Engineer at the jobsite prior to acceptance of the contract. Manufacturer's warranties and guaranties shall be a minimum of one year from start up and shall be in a bound manual form.

PART 2.- PRODUCTS

Evaporator

The evaporator shall be factory fabricated. The evaporator shall have the appropriate controls such as: evaporation process starting controls, automatic fill system, burner controls, level controlled gas-fired heat exchanger, low

solution level shutdown, high temperature shutdown, high solution level sensor, high solution level alarm, reduced air stream shut down, exhaust fan, 380 liter solution tank, tank insulation, oil skimmer; anti foam kit; inlet, outlet and cleanout port. The evaporator performance shall be between 96 and 114 liters/hour automatic feed evaporation rate.

Tank.--

The tank material for all wetted parts shall be carbon steel.

Burner.--

The evaporator burner shall operate using liquid propane gas with an operating range of 105 to 115 kw/hour.

Holding tank level controls.--

Holding tank level control shall be supplied by the evaporator manufacturer.

Suction pump.--

Suction pump to be supplied by the evaporator manufacturer.

CONTROLS

Control panel.--

Control panel shall be a single-door, NEMA Type 4 control panel enclosure conforming to the Joint Industry Conference Standards. Enclosure shall contain electrical mounting panel, hinged interior door and exterior dead front door. Enclosure shall be made of 14-gage, or heavier, steel with all seams continuously welded. A rolled-up lip shall be provided around three sides of hinged exterior door and around all sides of enclosure opening. Control panel shall have 150 mm of space reserved at the bottom for conduit entries and no equipment shall be mounted on the sides or at the bottom.

Controls.--

The evaporator controls shall include power ON/OFF, exhaust fan controls, burner controls, high temperature shutdown, low liquid level shutdown, manual high temperature reset, manual fill, high level alarm, automatic fill/level control, and holding tank level controls for starting evaporation process.

Electrical supply.--

The electrical supply shall be 120 volts, AC.

PART 3.- EXECUTION

INSTALLATION.--

General.—The evaporator shall be supplied complete with all components installed by the manufacturer and the unit installed at the site in accordance with the manufacturer’s recommendations.

INSTALLATION OF STORAGE TANK.--

General.--The storage tank shall be installed in accordance with the plans, the manufacturer's recommendations where applicable and the most recent Uniform Building Code. Penetrations of the storage tank for connection of piping or fittings shall be watertight. Two float switches shall be installed in the storage tank with exterior mounted junction box.

INSTALLATION OF SIGHT GAUGE TUBING AND FITTINGS.--

General.--The sight gauge shall be installed on the storage tank in accordance with the plans, these specifications, the tank manufacturer's recommendation and sight gauge manufacturer's recommendations where applicable. The connections to the storage tank and the sight gauge tubing and fittings shall be watertight.

FIELD QUALITY CONTROL.--

Testing.--The evaporator shall be tested for a period of 4 hours..
Operational testing shall be as specified in "Wash Water System" in Division 2, "Sitework," of these Special Provisions.

Training.—After completion and acceptance of testing, a two hour operational and maintenance demonstration shall be conducted by the evaporator manufacturer's representative for a maximum of 10 people. The Engineer shall be given a 5-day notice prior to the demonstration.

DIVISION 12. (BLANK)

DIVISION 13. SPECIAL CONSTRUCTION (BLANK)

DIVISION 14. CONVEYING SYSTEMS (BLANK)

DIVISION 15. MECHANICAL

15.01 MECHANICAL WORK

GENERAL

Scope.--This work shall consist of performing mechanical work in accordance with the details shown on the plans and these special provisions.

Mechanical work shall include furnishing all labor, materials, equipment and services required for providing heating, plumbing and liquefied petroleum gas (LPG) distribution.

Earthwork, foundations, sheet metal, painting, electrical, and such other work incidental and necessary to the proper installation and operation of the mechanical work shall be in accordance with the requirements specified for similar type work elsewhere in these special provisions.

System layouts are generally diagrammatic and location of equipment is approximate. Exact routing of pipes, ducts, etc., and location of equipment is to be governed by structural conditions and obstructions. Equipment requiring maintenance and inspection is to be readily accessible.

Roof penetrations shall be flashed and sealed watertight in accordance with the requirements specified under "Sheet Metal Flashing" in Division 7, "Thermal and Moisture Protection," of these special provisions.

SUBMITTALS

Product data.--A list of materials and equipment to be installed, manufacturer's descriptive data, and such other data as may be requested by the Engineer shall be submitted for approval.

Manufacturer's descriptive data shall include complete description, performance data and installation instructions for the materials and equipment specified herein. Control and wiring diagrams, rough-in dimensions for plumbing fixtures, and component layout shall be included where applicable.

Manufacturer's descriptive data shall be submitted for the following:

Fire Extinguisher
Radiant Heaters
Gas Pressure Regulator

Backflow Preventer
Check Valve
Ball Valve
Gas Valves
LPG tank and distribution system
LPG tank anchoring system

CLOSEOUT SUBMITTALS

Operation and maintenance manuals.--Prior to the completion of the contract, 3 identified copies of the operation and maintenance instructions with parts lists for the equipment specified herein shall be delivered to the Engineer at the jobsite. The instructions and parts lists shall be indexed and bound in a manual form and shall be complete and adequate for the equipment installed. Inadequate or incomplete material shall be returned. The Contractor shall resubmit adequate and complete manuals at no expense to the State.

Operation and maintenance manuals shall be submitted for the following equipment:

Fire Extinguisher
Radiant Heaters
Gas Pressure Regulator
Backflow Preventer
LPG tank and distribution system
LPG anchoring system

QUALITY ASSURANCE

Codes and standards.--Mechanical work, including equipment, materials and installation, shall conform to the California Building Standards Code, , and to the California Code of Regulations, Title 8, Chapter 4, Division of Industrial Safety (DIS).

WARRANTY

Warranties and guarantees.--Manufacturer's warranties and guarantees for materials or equipment used in the work shall be delivered to the Engineer at the jobsite prior to acceptance of the contract.

15.02 PIPE, FITTINGS AND VALVES

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of furnishing and installing pipes, fittings and valves in accordance with the details shown on the plans and these special provisions. Pipe, fittings and valves shall include such plumbing and piping accessories and appurtenances, not mentioned, that are required for the proper installation and operation of the plumbing and piping systems.

All piping insulation and associated material shall be in accordance with the requirements specified under "Mechanical Insulation," elsewhere in this Division 15.

The pipe sizes shown on the plans are nominal pipe size. No change in the pipe size shown on the plans shall be permitted without written permission from the Engineer.

The pipe and fitting classes and material descriptions shall be as specified herein. No change in class or description shall be permitted without written permission from the Engineer.

QUALITY ASSURANCE

Codes and standards.--Pipe, fittings and valves shall be installed in accordance with the requirements in the latest edition of the Uniform Plumbing Code, the manufacturer's recommendations and the requirements specified herein.

PART 2.- PRODUCTS

MATERIALS.--

PIPE AND FITTINGS

Class Description

A1

Schedule 40 galvanized steel pipe conforming to ASTM Designation: A 53, with 1040 kPa galvanized malleable iron banded screwed fittings and galvanized steel couplings. The weight of the zinc coating shall be not less than 90 percent of that specified in ASTM Designation: A 53.

B2

Schedule 40 black steel pipe conforming to ASTM Designation: A 53, with 1040 kPa black malleable iron banded screwed fittings and black steel couplings.
Steel pipe coating, where required, shall be factory applied plastic. Pipe coating shall be Standard Pipe Protection, X-Tru-Coat (0.50 mm thick); Pipe Line Service Corporation, Republic; 3M Company, Scotchkote 205 (0.30 mm thick); or equal.

B3

Schedule 80 black steel pipe conforming to ASTM Designation: A 53 grade B, 50 mm and smaller shall be 20 700 kPa WOG socket welding fittings and couplings or 13 800 kPa WOG threaded forged steel, ASTM Designation: A 105. 65 mm and larger shall be extra strong weight butt welding fittings and couplings.

H2

Type K hard copper tubing conforming to ASTM Designation: B 88, with wrought copper or cast bronze solder joint pressure fittings, stop type couplings and threaded adapters. Solder shall be lead-free.

H3

Type L hard copper tubing conforming to ASTM Designation: B 88, with wrought copper or cast bronze solder joint pressure fittings, stop type couplings and threaded adapters. Solder shall be lead-free.

P2

Polyvinyl chloride (PVC) plastic pipe and fittings conforming to ASTM Designation: D 2241, Type I, Grade 1, Standard Dimension Ratio (SDR) 21, rated for 1380 kPa working pressure at 23°C, National Sanitation Foundation approved. Pipe shall have bell ends conforming to ASTM Designation: D 3139 with triple edge rubber sealing ring. For pipe sizes 50 mm diameter and smaller, plain end pipe with solvent welded fittings ASTM Designation: D 2241, Type I, Grade 1, Standard Dimension Ratio (SDR) 21, rated for 1380 kPa may be used.

P3

Polyvinyl chloride (PVC) standard weight pipe and fittings, Schedule 40, conforming to ASTM Designation: D 1785. Pipe shall meet or exceed requirements of National Sanitation Foundation Standard No. 14. Pipe shall have bell ends conforming to ASTM Designation: D 2672. For pipe sizes 75 mm and smaller, plain end pipe with solvent welded fittings conforming to ASTM Designation: D 2241, may be used.

P4

Polyvinyl chloride (PVC) plastic pipe and fittings shall conform to AWWA Designation: C900, class 150, Standard Dimension Ratio (SDR) 18. Pipe shall have bell end with a solid cross section elastomeric ring conforming to ASTM Designation: D 3139.

Unions (for steel pipe)

Unions (for steel pipe) shall be 1730 kPa, threaded malleable iron, ground joint, brass to iron seat, galvanized or black to match piping.

Insulating union

Insulating union or flange as applicable shall be suitable for the service on which used. Connections shall be constructed such that the 2 pipes being connected are completely insulated from each other with no metal to metal contact. Insulating couplings shall not be used. Insulating union shall be F. H. Maloney; Central Plastics; EPCO; or equal.

Ball valve

Ball valve shall be two piece, minimum 2760 kPa WOG, bronze body and chrome plated or brass ball with full size port. Valve shall be Nibco Scott, T-580; Watts, B-6000; Kitz, 56; or equal.

LPG gas valve

LPG gas valve shall be listed, 1730 kPa (minimum) WOG bronze ball valve. Valve shall be Jenkins, Model 30-A; Crane, Accesso; Watts; or equal.

Check valve (40 mm and smaller)

Check valve (40 mm and smaller) shall be silent spring loaded type, threaded bronze body, nylon or teflon disc, beryllium or stainless steel helical spring and shaft, Class 125 and same size as pipe in which installed. Check valve shall be Nibco/Scott, T-480; CPV, 36; Kitz, 26; or equal.

Hose faucet

Hose faucet shall be compression type, angle pattern, wall flange at exterior locations, tee handle, 20 mm female thread with hose end, rough chrome or nickel plated finish for locations inside building, rough brass finish for others. Hose faucet shall be supplied with an integral or nonremovable threaded outlet vacuum breaker which meets the requirements of the American Society of Sanitary Engineering (ASSE) Standard: 1011. Hose faucet shall be Nibco, No. 63VB; Chicago, No. 13T; or equal.

MISCELLANEOUS ITEMS

Gas regulator

Gas regulator shall be listed as suitable for gas and equipped with full capacity relief valve, low pressure safety shut-off and weatherproof and insect proof vent for outside installation. Capacity shall be as shown on the plans. Gas regulator shall be Fisher; Reliance; Rockwell; or equal.

Wye strainer

Wye strainer shall be wye pattern, cast iron body and Type 304 stainless steel or monel strainer screen. The strainer screen shall have an open area equal to at least 3 times the cross sectional area of the pipe in which it is installed and shall be woven wire fabric with 20 mesh or perforated sheet with 850 micron maximum diameter holes.

Backflow preventer

Backflow preventer shall be factory assembled with 2 check valves, one pressure differential relief valve, 2 ball valves and 4 test cocks. Backflow preventers shall be of the approved type reduced pressure principle devices listed by the County of Los Angeles Department of Health Services, Cross-Connection and Water Pollution Control Section, 2525 Corporate Place, Monterey Park, California 91754, Telephone (213) 881-4140.

Water meter

Water meter shall be disc or turbine type, suitable for water service with a magnetic coupling and a minimum 860 kPa working pressure. Meter shall be 75 mm with a maximum pressure drop at 1135 LPM of 14 kPa. Readout shall be in cubic meters. Water meter shall be Badger; Neptune; Rockwell; Hersey; or equal.

Pipe wrapping tape and primer

Pipe wrapping tape shall be pressure sensitive polyvinyl chloride or pressure sensitive polyethylene tape having nominal thickness of 0.50 mm. Wrapping tape shall be Polyken, 922; Manville, Trantex VID-20; Scotchrap, 51; or equal.

Pipe wrapping primer shall be compatible with the pipe wrapping tape used.

Valve box

Valve box shall be precast high density concrete with polyethylene face and cast iron traffic rated cover marked "WATER," "GAS" or "CO-SS" as applicable. Extension shall be provided as required. Valve box shall be Christy, B3; Brooks Products Company, 3TL; Frazer, 3; or equal.

PART 3.- EXECUTION

INSTALLATION

INSTALLATION OF PIPES AND FITTINGS

Pipe and fittings.--Pipe and fittings shall be installed in accordance with the following designated uses:

Designated Use	Pipe and Fitting Class
Potable water (CW) in buildings	H3 or A1
Potable water underground within 1.5 m of the building	A1 or H2
Potable water underground 1.5 m beyond the building	P2, P3, P4, A1 or H2
Liquefied petroleum gas (LPG), 860 kPa or less, above ground	A1 or B2
LPG, 860 kPa or less, underground	B2 (plastic coated)
LPG, exceeding 860 kPa	B3
Soap lines	H3

Installing piping.--Water piping shall be installed generally level, free of traps and bends, and arranged to conform to the building requirements.

Piping installed underground shall be tested as specified elsewhere in these special provisions before backfilling.

Warehouse rooms, equipment bays, and loft areas shall have exposed piping.

Piping shall be installed parallel to walls. All obstructions shall be cleared, headroom preserved and openings and passageways kept clear whether shown or not. Piping shall not interfere with other work.

Where pipes pass through exterior walls, a clear space around pipe shall be provided. Space shall be caulked water tight with silicone caulk.

Underground plastic pipe shall be buried with No. 14 solid bare copper wire. Wire ends at pipe ends shall be brought up 200 mm and looped around pipe.

Gas piping shall not be installed under building concrete slabs or structure. An insulating connection and valve shall be installed above ground at each building supply.

Gas piping shall be pitched to equipment or to low point and provided with a 200 mm minimum dirt leg.

Water pipe near sewers.--Water pipe shall not be installed below sewer pipe in the same trench or at any crossing, or below sewer pipe in parallel trenches less than 3 m apart.

When a water pipe crosses above a sewer pipe, a vertical separation of at least 300 mm between the top of the sewer and the bottom of the water pipe shall be maintained.

Pipe sleeves.--The Contractor shall provide sleeves, inserts and openings necessary for the installation of pipe, fittings and valves. Damage to surrounding surfaces shall be patched to match existing.

PVC pipe sleeves shall be provided where each pipe passes through concrete floors, footings, walls or ceilings. Inside diameter of sleeves shall be at least 20 mm larger than outside diameter of pipe. Sleeves shall be installed to provide at least 10 mm space all around pipe the full depth of concrete. Space between pipes and pipe sleeves shall be caulked watertight.

Pipe penetrations in fire rated assemblies.--Where pipes pass through fire rated wall, floor or ceiling assemblies, the penetration shall be protected in accordance with the requirements specified under "Through-Penetration Firestopping" in Division 7, "Thermal and Moisture Protection," of these special provisions.

Cutting pipe.--All pipe shall be cut straight and true and the ends shall be reamed to the full inside diameter of the pipe after cutting.

Damaged pipe.--Pipe that is cracked, bent or otherwise damaged shall be removed from the work.

Pipe joints and connections.--Joints in threaded steel pipe shall be made with teflon tape or a pipe joint compound that is nonhardening and noncorrosive, placed on the pipe and not in the fittings.

The use of thread cement or caulking on threaded joints will not be permitted. Threaded joints shall be made tight. Long screw or other packed joints will not be permitted. Any leaky joints shall be remade with new material.

Cleaning and closing pipe.--The interior of all pipe shall be cleaned before installation. All openings shall be capped or plugged as soon as the pipe is installed to prevent the entrance of any materials. The caps or plugs shall remain in place until their removal is necessary for completion of the installation.

Securing pipe.--Pipe in the buildings shall be held in place by iron hangers, supports, pipe rests, anchors, sway braces, guides or other special hangers. Material for hangers and supports shall be compatible with the piping or neoprene isolators shall be used. Allowances shall be made for expansion and contraction. Steel pipe shall have hangers or supports every 3 m. Copper pipe 25 mm or smaller shall have hangers or supports every 2 m and sizes larger than 25 mm shall have hangers or supports every 3 m. Plastic pipe shall have hangers or supports every 1 m. Cast iron soil pipe with neoprene gaskets shall be supported at each joint. Vertical pipes shall be supported with clamps or straps. Horizontal and vertical piping shall be securely supported and braced to prevent swaying, sagging or flexing of joints.

Hangers and supports.--Hangers and supports shall be selected to withstand all conditions of loading to which the piping and associated equipment may be subjected and within the manufacturer's load ratings. Hangers and supports shall be spaced and distributed so as to avoid load concentrations and to minimize the loading effect on the building structure.

Hangers and supports shall be sized to fit the outside diameter of pipe or pipe insulation. Hangers shall be removable from around pipe and shall have provisions for vertical adjustment after erection. Turnbuckles may be used.

Materials for holding pipe in place shall be compatible with piping material.

Hanger rods shall be provided with locknuts at all threaded connections. Hanger rods shall be sized as follows:

Pipe Size	Minimum Hanger Rod Diameter
15 mm to 50 mm	10 mm
65 mm to 87 mm	13 mm

Wrapping and coating steel pipe.--Steel pipe buried in the ground shall be wrapped or shall be plastic coated as specified herein:

1. Wrapped steel pipe shall be thoroughly cleaned and primed as recommended by the tape manufacturer.
2. Tapes shall be tightly applied with 1/2 uniform lap, free from wrinkles and voids with approved wrapping machines and experienced operators to provide not less than 1.00 mm thickness.
3. Plastic coating on steel pipe shall be factory applied. Coating imperfections and damage shall be repaired to the satisfaction of the Engineer.

4. Field joints, fittings and valves for wrapped and plastic coated steel pipe shall be covered to provide continuous protection by puttying and double wrapping with 0.50 mm thick tape. Wrapping at joints shall extend a minimum of 150 mm over the adjacent pipe covering. Width of tape for wrapping fittings shall not exceed 50 mm. Adequate tension shall be applied so tape will conform closely to contours of fittings. Putty tape insulation compounds approved by the Engineer shall be used to fill voids and provide a smooth even surface for the application of the tape wrap.

Wrapped or coated pipe, fittings, and filed joints shall be approved by the Engineer after assembly. Piping shall be placed on temporary blocks to allow for inspection. Deficiencies shall be repaired to the satisfaction of the Engineer before backfilling or closing in.

Thrust blocks.--Thrust blocks shall be formed by pouring concrete between pipe and trench wall. Thrust blocks shall be sized and so placed as to take all thrusts created by maximum internal water pressure.

Plastic pipe underground shall be provided with thrust blocks and clamps at changes in direction of piping, connections or branches from mains 50 mm and larger, and all capped connections.

Union.--Unions shall be installed where shown and at each threaded or soldered connection to equipment and tanks. Unions shall be located so piping can be easily disconnected for removal of equipment or tanks. Unions shall be omitted at compression stops.

Insulating union and insulating connection.--Insulating union and insulating connection shall be provided where shown and at the following locations:

1. In metallic water, gas and air service connections into each. Insulating connections shall be installed on the exterior of the building, above ground and after shut-off valve.
2. In water, gas and air service connections in ground at point where new metallic pipes connect to existing metallic pipes. Install valve box above insulating connection.
3. At points of connections of steel water pipes to steel domestic water heaters and tanks.
4. At each end of buried ferrous pipe protected by cathodic protection.

Bonding at insulating connections.--Interior water piping and other interior piping that may be electrically energized and are connected with insulating connections shall be bonded in accordance with the California Electrical Code. Bonding shall all be coordinated with electrical work.

INSTALLATION OF VALVES

Exterior valves.--Exterior valves located underground shall be installed in a valve box marked "Water." Extensions shall be provided as required.

INSTALLATION OF FAUCETS

Hose faucet.--Faucets shall be installed with outlets 0.5 m above finished grade.

INSTALLATION OF MISCELLANEOUS ITEMS

Gas appliance connection.--Gas valve and flexible connector shall be provided for gas piping at each appliance. Appropriately rated gas cocks may be used in 15 mm gas pipe. Cock or valve shall be within one meter of the appliance.

Gas regulator.--Gas regulator shall be installed complete with dirt leg, capped test tee, union, insulating union, gas valve and fittings.

Backflow preventer.--Backflow preventer assembly shall include a wye strainer, backflow preventer, fittings and pipe. Assembly components shall be the same size as the pipe in which they are installed unless otherwise shown on the plans.

Backflow preventer shall be installed 1370 mm above ground and shall be the same size as the pipe in which it is installed unless otherwise shown on the plans.

Water meter.--Water meter shall be installed in horizontal piping run with no fittings located within 762 mm of either side of the meter.

Flushing completed systems.--All completed systems shall be flushed and blown out.

FIELD QUALITY CONTROL

Testing.--The Contractor shall test piping at completion of roughing in, before backfilling, and at other times as directed by the Engineer.

The system shall be tested as a single unit, or in sections as approved by the Engineer. The Contractor shall furnish necessary materials, test pumps, instruments and labor and notify the Engineer at least 3 working days in advance of testing. After testing, the Contractor shall repair all leaks and retest to determine that leaks have been stopped. Surplus water shall be disposed of after testing as directed by the Engineer.

The Contractor shall take precautions to prevent joints from drawing while pipes and appurtenances are being tested. The Contractor shall repair damage to pipes and appurtenances or to other structures resulting from or caused by tests.

General tests.--All piping shall be tested after assembly and prior to backfill, pipe wrapping, connecting fixtures, wrapping joints and covering the pipe. Systems shall show no loss in pressure or visible leaks.

The Contractor shall test systems according to the following schedule for a period of not less than 4 hours:

Test Schedule		
Piping System	Test Pressure	Test Media
Water	860 kPa	Water
Gas (except P6)	690 kPa	Air
Gas (P6)	350 kPa	Air

During testing of water systems, valves shall be closed and pipeline filled with water. Provisions shall be made for release of air.

Testing backflow preventers.--Backflow preventers installed by the Contractor shall be tested at the completion of the supply system installation for proper operation by a certified Backflow Preventer Tester.

The tester shall hold a valid certificate as a Backflow Preventer Tester from the county in which the device to be tested is located or, if the county does not have a certification program for Backflow Preventer Testers, the tester shall have a certificate from one of the following:

1. The American Water Works Association.
2. A county which has a certification program for Backflow Preventer Testers. The certification under which the tester has been certified shall be acceptable to the water purveyor and the local agency having jurisdiction.

Testing for proper operation shall conform to the procedures of the county in which the testing is being performed, or, if such procedures are not available in the county, such tests shall conform to the provisions in the latest edition of the Guidance Manual For Cross Connection Control Program, which is available from the California Department of Health Services, Division of Drinking Water and Environmental Management, 601 N 7th Street, P.O. Box 942732, Sacramento, CA 94234.

The Contractor shall notify the Engineer at least 5 days prior to testing backflow preventer. Such tests shall be satisfactorily completed after installation of the backflow preventer assembly and before operation of the systems.

One copy of all test results for the backflow preventer shall be furnished to the Engineer.

Full compensation for providing the certified Backflow Preventer Tester and for testing the backflow preventer shall be considered as included in the lump sum price paid for building work and no additional compensation will be allowed therefor.

15.03 MECHANICAL INSULATION

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of furnishing and installing mechanical insulation in accordance with the details shown on the plans and these special provisions.

Piping insulation shall be installed on all potable water piping, above grade, in non-conditioned spaces.

QUALITY ASSURANCE

Codes and standards.--Mechanical insulation shall conform to California State Energy Commission regulations and, where applicable, shall meet American Society of Testing and Materials (ASTM) standards.

All materials shall bear the label of the Underwriters Laboratory (UL) or other approved testing laboratory indicating that the materials proposed for use conform to the required fire hazard ratings.

Pipe safety insulation shall conform to Section 1504(b) of Title 24, Part 5, California Plumbing Code.

PART 2.- PRODUCTS

MATERIAL

Exterior piping insulation

Piping insulation shall be polyurethane foam insulation with a service temperature range of 0°C to 120°C. A 0.15 mm vapor barrier shall be applied over the top off the insulation. The vapor barrier shall be installed with an adhesive as recommended by the manufacturer.

PVC jacket

PCV jacket shall be rated for a service temperature of 80°C. PVC jacket shall include covers specifically designed to cover pipe fittings.

Alternative pipe insulation

Alternative pipe insulation shall be closed cell, elastomeric material in a flexible tubular form. Insulation shall have a service temperature range between -40°C and 93°C, a minimum vapor transmission rating of 0.29 Perm-m, and a minimum thermal resistance of R-0.5 K•m2/W.

PART 3.- EXECUTION

INSTALLATION

General.--Insulation materials shall be neatly installed with smooth and even surfaces, jackets drawn tight and smoothly cemented down.

Insulation material shall not be installed until all pipes or surfaces to be covered are tested for leaks, cleaned and dried, and foreign materials, such as rust, have been removed.

Piping insulation.--Piping insulation shall be in accordance with the following, except that unions, unless integral with valves, and flexible connections shall not be insulated.

a. Where insulation butts against flanges or is discontinued, insulation shall be tapered to pipe to allow for covering jacket to completely seal off end of insulation.
   Insulation shall be extended on the valve bodies up to the valve bonnet.

Extend insulation continuous through pipe sleeves.

Insulating cement shall be applied to fittings, valves, and strainers and troweled smooth to thickness of adjacent covering. Strainer cleanout plugs shall remain accessible. Covers fabricated from molded pipe covering may be used in lieu of cement, provided covers are neat and well secured.

b. Jacket flap shall be sealed down with factory applied self-sealing lap. Seams shall be lapped not less than 40 mm. Jacket shall be secured with aluminum bands installed at 300 mm centers.

c. Exposed outdoor insulation shall have an additional 0.40 mm minimum thickness aluminum jacket applied over the completed insulation. The jacket shall have a factory applied moisture barrier and shall be Childers; Smith; or equal.

End joints shall be lapped with aluminum holding traps located directly over the lap. Additional aluminum holding straps shall be placed at 200 mm centers. Jacket at ells and tees shall be mitered, or premanufactured fitting jackets shall be provided, with additional aluminum holding bands, as required. All joints shall be sealed watertight using silicon type, heat resistant sealant.

Alternate pipe insulation, where used, shall be installed on hot water piping before connections are made or the insulation may be slit lengthwise, applied to pipe and sealed with adhesive.

l5.04 LIQUEFIED PETROLEUM GAS (LPG) SYSTEM

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of furnishing and installing a liquefied petroleum gas (LPG) distribution system, and removing an existing system, in accordance with the details shown on the plans and these special provisions.

The LPG distribution system shall include two LPG storage tanks, pipe, fittings, valves and such other system components necessary for the proper installation and operation of the LPG system.

Permits.--The Contractor shall obtain the required permits to operate pressure vessels in accordance with the requirements of the State Division of Industrial Safety (DIS), shall pay the costs for such permits and shall perform all required tests. Such permits shall be posted under glass at the site of the work.

QUALITY ASSURANCE

Codes and standards.--All work performed and materials installed shall conform to the California Building Standards Code, Title 24, Part 4 and Part 5; the California Code of Regulations, Title 8, Chapter 4, Subchapter l, Article 5; and National Fire Protection Association Standard No. 58.

PART 2.- PRODUCTS

Tanks

Tanks shall be constructed and stamped for 1730 kPa working pressure in accordance with the ASME Code for "Unfired Pressure Vessels for Petroleum Liquids and Gases." Tanks shall have certification of testing for 2590 kPa. Tanks shall include a rainhood with top opening for relief valve and welded steel supports with provisions for bolting to the concrete foundation. Tanks shall be shop prime painted with 2 coats of red oxide ferrous metal primer. Primer shall not contain lead pigments.

Tank valves, fittings, regulators and accessories

Tank valves, fittings, regulators and accessories shall be UL listed and labeled. Valves, fittings, regulators and accessories shall be as required by the California Codes listed above and shall be Rego, Fisher, Rockwell, or equal.

Pipe and fittings (at the tanks and underground)

Pipe and fittings shall be as specified under "Pipe, Fittings and Valves" in Division 15, "Mechanical," of these special provisions. Piping below grade shall be factory coated.

Warning signs

Warning signs shall be sheet steel, not less than 1.2 mm thick (18-gage) with a baked enamel coating and shall have red letters on a white background.

PART 3.- EXECUTION

INSTALLATION

General.--The LPG tanks and system components shall be installed in accordance with NFPA standards, the manufacturer's instructions and the approved installation drawings.

Foundation.--The tanks shall be installed on a concrete foundation. The tank installation shall include seismic restraints and provisions for expansion and contraction. Neoprene or asphalt impregnated felt anti-corrosion pads shall be installed between the saddles and the concrete foundation. The existing foundation pad and tank supports shall be demolished and removed.

The concrete foundation shall be constructed in accordance with the requirements specified for minor work under "Cast-In-Place Concrete" in Division 3, Concrete and Reinforcement," of these special provisions.

All openings shall be capped until ready for field connections. Piping shall be supported adequately, with allowance for swing joint movement.

Piping installation.--Piping shall be buried 900 mm minimum depth and shall be provided with cathodic protection. Insulating unions shall be installed at least 150 mm above grade between the coated pipe and the above ground pipe lines.

Joints for underground piping shall be cleaned, primed and wrapped in accordance with the requirements specified under "Pipes, Fittings and Valves" in Division 15, "Mechanical," of these special provisions. The cleaning, priming and wrapping of pipe joints shall be completed after testing the piping system.

Coated pipe inspection.--The coating on all coated pipe shall be inspected for flaws prior to any testing, and shall be reinspected after testing and before the cleaning, priming and wrapping of the joints.

Finish painting.—After installation of the tanks, all areas where the shop applied primer has been damaged or has deteriorated shall be thoroughly cleaned and spot painted with primer. Spot painted areas shall be approved by the Engineer prior to the application of the finish coats.

Two applications of the finish coating shall be applied to shop primed steel surfaces exposed to view after the erection of the tanks has been completed. The finish coating shall be white gloss, exterior, alkyd enamel.

The word "FLAMMABLE" shall be painted on each side of the tanks. Sign lettering shall be standard-type not less than 100 mm in height. The lettering color shall be red and shall be in sharp contrast to the color of the tanks.

Warning sign installation and application.--Two warning signs with the words "NO SMOKING, OPEN FLAMES OR OTHER SOURCE OF IGNITION PERMITTED WITHIN 25 FEET" shall be placed at the locations shown on the plans. Sign lettering shall be standard-type not less than 38 mm in height. The lettering color shall be in sharp contrast to the color of the sign.

FIELD QUALITY CONTROL

Testing.--After construction, installation and pipe testing, the LPG system shall be pressure tested with air or nitrogen. The system shall be tested for a minimum time period of 30 minutes at 1380 kPa. If any leaks are detected during the test, the system shall be repaired and retested until no leaks are detected.

After the pressure tests have been completed, the LPG system shall be purged 5 times with methanol (methyl alcohol), using one-liter per 1000 liters water capacity, to remove moisture from the system.

After testing and purging the system, the tanks shall be filled to 25 percent of the water capacity of the tanks, measured in liters, with State-furnished LPG as provided under "State-Furnished Materials" in Division l, "General Requirements," of these special provisions.

An operational test shall be performed on the LPG system upon completion of the pressure tests, the purging of the system and the delivery of the State furnished LPG fuel. The operational test shall consist of operating all LPG equipment for a period of three 24-hour days.

15.05 HEATING EQUIPMENT AND SYSTEMS

PART 1.- GENERAL

Scope.--This work shall consist of furnishing, installing and testing heating, and ventilatingequipment in accordance with the details shown on the plans and these special provisions.

The performance rating and electric service of the heating equipment shall be as shown on the plans.

Temperature controls.--Thermostats, relays, and other sensor type control devices required for this work shall be furnished and installed by the supplier of the heating, and ventilatingequipment. All temperature control wiring shall be furnished and installed in accordance with the requirements specified in Division 16, "Electrical," of these special provisions.

Codes and standards.--Equipment and systems shall conform to California State Energy Commission Regulations and, where applicable, shall be–American Gas Association (AGA), Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), and Air Movement and Control Association (AMCA) approved for performance ratings and application shown on the plans.

Any appliance for which there is a California standard established in the Appliance Efficiency Standards may be installed only if the manufacturer has certified to the Commission, as specified in those regulations, that the appliance complies with the applicable standards for that appliance. Space conditioning equipment may be installed only if the manufacturer has certified that the equipment meets or exceeds all applicable efficiency requirements listed in the Energy Efficiency Standards.

PART 2.- PRODUCTS

HEATING UNITS

High intensity infrared radiant heaters

High intensity infrared radiant heaters shall be AGA approved for LPG and shall be equipped with intermittent ignition devices, electric flame safety, and junction boxs secured to the units. All components shall be factory assembled. Radiant heaters shall be provided with an aluminum rectangular reflector and mounting brackets. Radiant heaters shall be suspended by existing all thread rod hangers. High intensity infrared radiant heaters shall be Detroit (models DR-30 and DR-50),Solaronics; Lambert; or equal.

Automatic controls shall be provided to shut off the electric ignition if the pilot fails to light.

Electric wall heater

Electric wall heater shall be radiant type, and shall be equipped with a grille and integral thermostat. Electric wall heater shall be 208 volt AC single phase 1.5 kW.

FANS AND VENTILATORS

Exhaust fan (wall mounted).--

Exhaust fan shall be wall mounted, AMCA certified and shall be equipped with grille, metal housing, backdraft damper, centrifugal fan wheel and bird screen. Fan motor and fan assembly shall be isolated from base with rubber vibration isolators. Fan shall be completely weatherproof and shall have a disconnect means under the hood and fan

motor shall have integral thermal overload protection. Fan motor shall be 120 volt AC 0.2 kW. Wall exhaust fan shall be Jenn-Air; Carnes; EWDA; Penn; or equal.

HEATER CONTROLS

Radiant heater thermostat

Existing thermostat and time shall be used.

PART 3.- EXECUTION

INSTALLATION

Heaters.--Radiant heaters shall be installed in such a manner as to insure adequate furnace clearance and separation of combustion air and circulating air. Appliances shall be connected to a rigidly mounted gas pipe supply system by an AGA approved flex connector and gas valve.

Existing Radiant heaters shall be removed in accordance with Division 2 Sitework in these specifications. New radiant heaters shall be suspended by the existing all thread rods and hardware. Heaters shall be angled to minimize heating of adjacent walls.

Temperature controls.--Temperature control for each radiant heater shall be provided by existinglow voltage thermostats as shown on the plans.

Each thermostat shall be insulated from the outside walls, and shall be provided with an aluminum radiation shield above the thermostat.

FIELD QUALITY CONTROL

Pre-test requirements.--Before starting or operating systems, equipment shall be cleaned and checked for proper installation and servicing.

The Contractor shall replace or revise any equipment, systems or work found deficient during tests.

Project completion tests.--The Engineer shall be notified at least 3 working days in advance of starting project completion tests.

Upon completion of mechanical work and pre-test requirements, or at such time prior to completion as determined by the Engineer, the Contractor shall operate and test installed mechanical systems for at least 3 consecutive 8-hour days to demonstrate satisfactory overall operation.

DIVISION 16. ELECTRICAL

16.01 ELECTRICAL WORK

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of performing electrical work in accordance with the details shown on the plans and these special provisions.

Electrical work shall include furnishing all labor, materials, equipment and services required to construct and install the complete electrical system shown on the plans and the work of installing electrical connections for the thermostats, motors, evaporators, float switches, heaters and controls specified elsewhere in these special provisions.

System layouts are generally diagrammatic and location of equipment is to be governed by structural conditions and other obstructions, and shall be

coordinated with the work of other trades. Equipment requiring maintenance and inspection shall be located where it is readily accessible for the performance of such maintenance and inspection.

Related work.--Earthwork, foundations, sheet metal, painting, mechanical and such other work incidental to and necessary for the proper installation and operation of the electrical work shall be done in accordance with the requirements specified for similar work elsewhere in these special provisions.

Manuals shall be submitted for the following equipment:

Emulsion tank control panel

QUALITY ASSURANCE

Codes and standards.--All work performed and materials installed shall be in accordance with the National Electrical Code; the California Building Standards Code, Title 24, Part 3, "California Electrical Code," and the California Code of Regulations, Title 8, Chapter 4, "Electrical Safety Orders," and all state ordinances.

Warranties and guarantees.--Manufacturer's warranties and guarantees for materials or equipment used in the work shall be delivered to the Engineer at the jobsite prior to acceptance of the contract.

TESTING

After the electrical system installation work has been completed, the electrical system shall be tested in the presence of the Engineer to demonstrate that the electrical system functions properly. The Contractor shall make necessary repairs, replacements, adjustments and retests at his expense.

16.02 BASIC MATERIALS AND METHODS

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of furnishing and installing conduits, conductors, fittings, and wiring devices in accordance with the details shown on the plans and these special provisions.

Conduits, conductors, fittings, and wiring devices shall include those accessories and appurtenances, not mentioned, that are required for the proper installation and operation of the electrical system.

SUBMITTALS

Product data.--A list of materials and equipment to be installed and the manufacturer's descriptive data shall be submitted for approval.. Any other data as requested by the Engineer shall also be submitted for approval.

Manufacturer's descriptive data shall include complete description, performance data and installation instructions for the materials and equipment specified herein. Control and wiring diagrams, rough-in dimensions for recessed junction and pull boxes, and component layout shall be included where applicable. All control and power conductors on the shop drawings shall be identified with wire numbers.

PART 2.- PRODUCTS

CONDUITS AND FITTINGS

Rigid steel conduit and fittings

Rigid steel conduit shall be threaded, full weight rigid steel, hot-dip galvanized inside and outside with steel or malleable iron fittings. Fittings shall be threaded unless otherwise specified or shown on the plans.

Split or three-piece couplings shall be electroplated, malleable cast iron couplings.
Insulated grounding bushings shall be threaded malleable cast iron body with plastic insulated throat and steel, lay-in ground lug with compression screw.
Insulated metallic bushings shall be threaded malleable cast iron body with plastic insulated throat.

Electrical metallic tubing (EMT) and fittings

Electrical metallic tubing shall be formed of cold rolled strip steel, electrical resistance welded continuously along the longitudinal seam with zinc coating outside and enamel or lacquer coating inside.
Couplings shall be electroplated, rain and concrete tight, gland compression type, steel body couplings with malleable iron nuts.
Connectors shall be electroplated, rain and concrete tight, gland compression type, steel body connectors with male hub, die cast zinc nut and insulated plastic throat.

Flexible metallic conduit and fittings

Flexible metallic conduit shall be fabricated in continuous lengths from galvanized steel strip, spirally wound and formed to provide an interlocking design.
Fittings shall be electroplated screw-in type with malleable cast iron body and threaded male hub with insulated throat.

Liquid tight flexible metallic conduit and fittings

Liquid tight flexible metallic conduit shall be fabricated in continuous length from galvanized sheet steel, spirally wound and formed to provide an interlocking design with an extruded polyvinyl chloride cover.
Fittings shall be electroplated, malleable cast iron body, with cap nut, grounding ferrule, and connector body with insulated throat.

Rigid non-metallic conduit and fittings

Rigid non-metallic conduit shall be Schedule 40, high impact, nonconducting, self-extinguishing polyvinyl chloride (PVC) rigid non-metallic conduit for direct underground burial.
Couplings shall be PVC, socket type or thread on one end and socket type on the other end as required for the particular application.
Terminal adapters for adapting PVC conduit to boxes, threaded fittings, or metallic conduit system shall be PVC adapters with threads on one end and socket type on the other end.

CONDUCTORS

Cables

Cables for float switches and pump motors shall be as specified elsewhere in these special provisions.

Conductors

Conductors shall be stranded copper wire.
Conductor insulation types unless otherwise shown or specified, shall be as follows:

1. Conductors across hinges of control panel enclosures shall be Type MTW.
2. Conductors shall be type XHHW-2 in wet and outdoor locations.
3. Conductors shall be type THHN in dry locations.

Wire connections and devices

Wire connections and devices shall be pressure or compression type, except that connectors for No. 10 AWG and smaller conductors in dry locations may be preinsulated spring-pressure type.

ELECTRICAL BOXES

Outlet, device and junction boxes

Unless otherwise shown or specified, boxes shall be galvanized steel boxes with knock-outs and shall be the size and configuration best suited to the application indicated on the plans. Minimum size of outlet, receptacle, switch or junction boxes shall be 100 mm square by 40 mm deep, except that switch boxes for the installation of single switches and outlet boxes for flush-mounted light fixtures shall be 50 mm by 75 mm by 40 mm deep.

Multiple switches shall be installed in standard gang boxes, unless otherwise specified or shown on the plans.

Cast metal boxes shall be cast iron boxes with threaded hubs and shall be of the size and configuration best suited to the application shown on the plans.

Unless otherwise shown or specified, surface-mounted boxes shall have galvanized steel covers with metal screws.

Weatherproof junction boxes shall have cast iron boxes with gaskets.

Weatherproof switch and receptacles shall be cast iron boxes with gasketed covers and gasketed hinged flaps to cover switches and receptacles.

Unless otherwise shown or specified, all PVC boxes shall be PVC boxes with hubs or equivalent means for conduit entry and shall be the size and configuration best suited to the application indicated on the plans. Minimum size of outlet, receptacle, switch or junction boxes shall be 100 mm square by 40 mm deep, except that switch boxes for the installation of single switches and outlet boxes for light fixtures shall be 50 mm by 75 mm by 40 mm deep.

All PVC junction boxes shall have PVC covers with gaskets.

All PVC switch and receptacle boxes shall have gasketed covers with gasketed hinged flaps to cover switches and receptacles.

Sectional device plates will not be permitted.

Underground pull boxes

Pull boxes shall be high density reinforced concrete box with ultraviolet inhibitor polyethylene etched face anchored in concrete and fiberglass cover with hold down bolts. The polyethylene and fiberglass material shall be fire resistant and show no appreciable change in physical properties with exposure to the weather. No. 3 1/2 pull box shall be Brooks Products, No. 3 1/2; Christy Concrete Products, N9; or equal. No. 5 pull box shall be Brooks Products No. 5; Christy Concrete Products, N30; or equal.

RECEPTACLES AND SWITCHES

Duplex receptacles

Duplex receptacles shall be NEMA Type 5-20R, 3-wire, 20-ampere, 125-volt AC, safety grounding, ivory color, specification grade receptacle suitable for wiring with stranded conductors.

Vehicle lift receptacles

Vehicle lift receptacles shall be surface-mounted, 600-volt, 60-ampere, 3-wire, 4-pole, circuit breaking, weather resistant, raintight receptacle with female interior assembly. The receptacle shall be complete with back box, angle adapter and spring door. The receptacle shall be grounded through extra pole and shell, and shall have crimp or solder type connections. A mating plug for the receptacle shall be provided.

Snap switches

Snap switches shall be 20-ampere, 120/277-volt AC, quiet type, specification grade, ivory color switch with silver cadmium alloy contacts. Switch shall be suitable for wiring with stranded conductors.

Lights timer switches

Lights timer switches shall be spring-wound mechanical timer switches with 2-hour range in a surface mounted weatherproof enclosure. The contact shall be rated 20-ampere at 125-volt, AC.

Exhaust fan timer switch

Exhaust fan timer switches shall be spring-wound mechanical timer switch with 2-hour range in a surface mounted weatherproof enclosure. The contact shall be rated 20-ampere at 125-volt, AC.

MISCELLANEOUS MATERIALS

Warning Tape

Warning tape shall be 100 mm wide and contain the printed warning "CAUTION ELECTRICAL CONDUIT" in bold 19 mm black letters at 760 mm intervals on bright orange or yellow background. The printed warning shall be non-erasable when submerged under water and resistant to insects, acids, alkali, and other corrosive elements in the soil. The tape shall have a tensile strength of not less than 70 kg per 100 mm wide strip and shall have a minimum elongation of 700 percent before breaking.

Pull ropes

Pull ropes shall be nylon or polypropylene with a minimum tensile strength of 225 kg.

Watertight conduit plugs

Watertight conduit plugs shall be a hollow or solid stem expansion plugs complete with inner and outer white polypropylene compression plates and red thermoplastic rubber seal. Seal material shall be non-stick type rubber resistant to oils, salt, and alkaline substances normally available at the construction sites.

Anchorage devices

Anchorage devices shall be corrosion resistant, toggle bolts, wood screws, bolts, machine screws, studs, expansion shields, and expansion anchors and inserts.

Electrical supporting devices

Electrical supporting devices shall be one hole conduit clamps with clamp backs, hot-dipped galvanized, malleable cast iron.

Construction channel shall be 41 mm x 41 mm, 2.66 mm (12-gage) galvanized steel channel with 13 mm diameter bolt holes, 40 mm on center in the base of the channel.

Ground rod(s)

Ground rod(s) shall be a 19 mm (minimum) galvanized or copper clad steel rod, 3 meters long.

PART 3.- EXECUTION

INSTALLATION

Conduit, general.--Rigid steel conduit shall be used unless otherwise shown on the plans or specified in these special provisions.

Electrical metallic tubing may be used in furred spaces and for exposed work indoors above the switch height unless otherwise noted on the plans.

Unless otherwise specified or shown on the plans, flexible metal conduit shall be used to connect suspended lighting fixtures, motors, HVAC equipment, and other equipment subject to vibration in dry locations.

Unless otherwise specified or shown on the plans, liquid-tight flexible metal conduit shall be used to connect motors, HVAC equipment, and other equipment subject to vibration in wet locations.

Rigid non-metallic conduit shall be used at the locations shown on the plans for direct underground burial 762 mm below grade and for exposed work inside the existing Sand Storage. All risers and elbows shall be rigid steel.

Conduit installation.--Conduit trade sizes are shown on the plans. No deviation from the conduit size shown on the plans will be permitted without written permission from the Engineer.

Conduit shall be concealed unless otherwise shown on the plans.

Conduits shall be tightly covered and well protected during construction using metallic bushings and bushing "pennies" to seal open ends.

Rigid non-metallic conduit bends of 30 degrees or greater shall be factory-made long radius sweeps. Bends less than 30 degrees shall be made using an approved heat box.

A pull rope shall be installed in all empty conduits. At least one meter of pull rope shall be doubled back into the conduit at each termination.

Locations of conduit runs shall be planned in advance of the installation and coordinated with the ductwork, plumbing, ceiling and wall construction in the same areas and shall not unnecessarily cross other conduits or pipe, nor prevent removal of ceiling tiles or panels, nor block access to mechanical or electrical equipment.

Where practical, conduits shall be installed in groups in parallel, vertical or horizontal runs and at elevations that avoid unnecessary offsets.

Exposed conduit shall be installed parallel and at right angles to the building lines.

Conduits shall not be placed closer than 300 mm from a parallel hot water or steam pipe or 75 mm from such lines crossing perpendicular to the runs.

All raceway systems shall be secured to the building structures using specified fasteners, clamps and hangers.

Single conduit runs shall be supported by using one hole pipe clamps. Where run horizontally on walls in damp or wet locations, conduit shall be installed with "clamp backs" to space conduit off the surface.

Multiple conduit runs shall be supported with construction channel secured to the building structure. Conduits shall be fastened to construction channel with channel compatible pipe clamps.

Raceways of different types shall be joined using approved couplings or transition fittings.

Expansion couplings shall be installed where conduit crosses a building separation or expansion joint.

All floor and wall penetrations shall be sealed water-tight.

Existing underground conduit to be incorporated into a new system shall be cleaned with a mandrel or cylindrical wire brush and blown out with compressed air.

Conduit terminations.--Rigid steel conduits shall be securely fastened to cabinets, boxes and gutters using 2 locknuts and specified insulating metallic bushing. Electrical metallic tubing shall be securely fastened to cabinets, boxes and gutters using specified connectors. Conduit terminations at exposed weatherproof enclosures and cast outlet boxes shall be made watertight using specified hubs.

Grounding bushings with bonding jumpers shall be installed on all type of conduits terminating at concentric knockouts and on all conduits containing service conductors, grounding electrode conductor, and conductors feeding separate buildings.

Rigid non-metallic conduits shall be securely fastened to the non-metallic boxes and lighting fixtures using specified connectors.

Rigid non-metallic conduits shall be terminated inside the underground pull boxes with an approved conduit bushings or fittings. All conduits shall enter the pull box at an angle of 90 degrees.

All future conduits terminated in underground pull boxes or exposed indoor and outdoor shall be provided with watertight conduit plugs.

Warning Tape.--Warning tape shall be placed over each conduit in a trench. Each warning tape shall be centered over the conduit and shall be placed over the 150 mm layer of sand covering the conduit as described elsewhere in these special provisions.

Conductor and cable installation.--Conductors shall not be installed in conduit until all work of any nature that may cause injury is completed. Care shall be taken in pulling conductors that insulation is not damaged. An approved non-petroleum base and insulating type pulling compound shall be used as needed.

All cables shall be installed and tested in accordance with manufacturer's recommendations.

Splices and joints shall be insulated with insulation equivalent to that of the conductor.

Provide 155 mm of slack at each outlet and device connection. If the outlet or device is not at the end of a run of wire, connection shall be made with correctly colored pigtails tapped to the runs with splices as specified herein.

Branch circuit conductors in panelboards and load centers shall be neatly trained along a path from the breaker terminals to their exit point. The conductors shall have ample length to transverse the path without strain, but shall not be so long as to require coiling, doubling back, or cramming. The path shall transverse the panelboard gutter spaces without entering a gutter containing service conductors and, unless otherwise shown on the plans, without entering the gutter space of any panelboard feeder.

All pressure type connectors and lugs shall be retightened after the initial set.

Splices in underground pull boxes and similar locations shall be made watertight.

Junction boxes in furred or accessible ceiling spaces shall be identified with felt-tip pen denoting the circuits contained in the box.

Conductor identification.--The neutral and equipment grounding conductors shall be identified as follows:

Neutral conductor shall have a white or natural gray insulation except that conductors No. 4 and larger may be identified by distinctive white marker such as paint or white tape at each termination.

Equipment grounding conductor shall be bare or insulated. If insulated, equipment grounding conductors shall have green or green with one or more yellow stripes insulation over its entire length except that conductors No. 4 and larger may be permanently identified by distinctive green markers such as paint or green tape over its entire exposed insulation.

Ungrounded feeder and branch circuit conductors shall be color coded by continuously colored insulation, except conductors No. 6 AWG or larger may be color coded by colored tape at each connection and where accessible. Ungrounded conductor color coding shall be as follows:

SYSTEM	COLOR CODE
120/208V-Three phase	Black, red, blue

Once an insulated circuit conductor, including grounded and ungrounded conductors, is identified with a specific color code, that color code shall be used for the entire length of the circuit.

Where more than one branch circuit enters or leaves a conduit, panel, gutter, or junction box, each conductor shall be identified by its panelboard and circuit number. All control conductors including control conductors of manufacturer supplied and field wired control devices shall be identified at each termination with the wire numbers shown on the plans, approved shop drawings, and as directed by the Engineer where deemed necessary. Identification shall be made with one of the following:

1. Adhesive backed paper or cloth wrap-around markers with clear, heat shrinkable tubing sealed over either type of marker.
2. Self-laminating wrap around type, printable, transparent, permanent heat bonding type thermoplastic film markers.
3. Pre-printed, white, heat-shrinkable tubing.

Each terminal block shall have a molded marking strip attached with screws. The identifying numbers of the terminating conductors, as shown on the plans or on the submittal drawings, shall be engraved in the marking strip.

Outlet, device and junction box installation.--Where exposed threaded steel conduits are connected to an outlet, device, or junction box below switch height, the box shall be a cast metal box. Unless otherwise shown on the plans or specified in these special provisions, all other boxes shall be sheet steel boxes. Weatherproof outlet, device and junction boxes shall have cast metal covers with gaskets. Unless otherwise shown on the plans or specified in these special provisions, all other boxes shall have standard galvanized covers.

All boxes shall finish flush with building walls, ceiling and floors except where exposed work is called for.

Raised device covers (plaster rings) shall be installed on all boxes concealed in concrete, masonry or stud walls.

No unused openings shall be left in any box. Knockout seals shall be installed as required to close openings.

Outlet, device, and junction boxes shall be installed at the locations and elevations shown on the plans or specified herein. Adjustments to locations may be made as required by structural conditions and to suit coordination requirements of other trades.

Fixture outlet boxes installed in suspended ceilings of gypsum board or lath and plaster construction shall be mounted on 1.52 mm (16-gage) metal channel bars attached to main ceiling runners.

Fixture outlet boxes for pendant-mounted fixtures installed in suspended ceilings supporting acoustical tiles or panels shall be supported directly from the structures above.

Underground pull box installation.--Electrical pull box covers or lids shall be marked "ELECTRICAL."

The bottom of pull boxes shall be bedded in 155 mm of clean, crushed rock or gravel and shall be grouted with 40 mm thick grout prior to installation of conductors. Grout shall be sloped to a 25 mm PVC pipe drain hole. Conduit shall be sealed in place with grout.

Top of pull boxes shall be flush with surrounding grade or top of curb. In unpaved areas where pull box is not immediately adjacent to and protected by a concrete foundation, pole or other protective construction, the top of pull box

shall be set at plus 30 mm above surrounding grade. Pull boxes shown on the plans in the vicinity of curbs shall be placed adjacent to the back of curb. Pull boxes shown on the plans adjacent to lighting standards shall be placed on the side of foundation facing away from traffic.

Ground rod(s) installation.--The ground rod(s) shall be driven vertically until the top is 155 mm above the surrounding surface. When vertical penetration of the ground rod cannot be obtained, an equivalent horizontal grounding system, approved by the Engineer, shall be installed.

Anchorages.--Hangers, brackets, conduit straps, supports, and electrical equipment shall be rigidly and securely fastened to surfaces by means of toggle bolts on hollow masonry; expansion shields and machine screws, or expansion anchors and studs or standard preset inserts on concrete or solid masonry; machine screws or bolts on metal surfaces; and wood or lag screws on wood construction.

Anchorage devices shall be installed in accordance with the anchorage manufacturer's recommendations.

Mounting heights.--Electrical system components shall be mounted at the following mounting heights, unless otherwise shown on the plans. The mounting height dimensions shall be measured above the finished floor to the bottom of the device or component.

16.03 ELECTRICAL EQUIPMENT

PART 1.- GENERAL

SUMMARY

Scope.--This work shall consist of furnishing and installing panelboards, disconnect switches, and related accessories in accordance with the details shown on the plans and these special provisions.

Related work.--Anchorage devices shall be as specified under "Basic Materials and Methods" elsewhere in this Division 16.

SUBMITTALS

Product data.--A list of materials and equipment to be installed and the manufacturer's descriptive data shall be submitted for approval.. Any other data as requested by the Engineer shall also be submitted for approval.

Manufacturer's descriptive data shall include complete description, performance data and installation instructions for the materials and equipment specified herein. Control and wiring diagrams, rough-in dimensions, and component layout shall be included where applicable. All control and power conductors on the shop drawings shall be identified with wire numbers.

PART 2.- PRODUCTS

PANELBOARDS

Panelboard D

Panelboard D shall be indoor type, surface-mounted, factory assembled, 3-phase, 4-wire, 120/208-volt, AC panelboard at least 508 mm wide with 225-ampere main lugs, insulated neutral, hinged door and molded case branch circuit breakers as shown on the plans. Panel shall be Square D Company, General Electric or equal.

Panelboard W

Panelboard W shall be indoor type, surface-mounted, factory assembled, 3-phase, 4-wire, 120/208-volt, AC panelboard at least 508 mm wide with 150-ampere main circuit breaker, insulated groundable neutral, hinged door and molded case branch circuit breakers as shown on the plans. Panels shall be Square D Company, General Electric, or equal.

CONTACTORS

Exhaust fan contactor

Exhaust fan contactor shall be single-pole, 600-volt (maximum), NEMA Size 0, full voltage contactor with 120-volt coil and double break silver contacts in a weatherproof enclosure.

SWITCHES

Exhaust fan disconnect switch

Exhaust fan disconnect switch shall be single-pole, 120-volt, 20-ampere, specification grade, AC switch in a nonmetallic (PVC) box with weatherproof cover .

Lift pump disconnect switch

Lift pump disconnect switch shall be 2-pole, 240-volt, AC, 30-ampere, non-fusible general duty safety switch in a NEMA Type 3R enclosure.

CONTROL PANEL

Lift pump control panel

Lift pump control panel enclosure shall be single exterior hinged door, dust tight NEMA Type 12 containing an electrical mounting panel and door clamps. The enclosure shall be factory prewired in conformance with NEMA Class II, Type C wiring. The following components shall be mounted on the door: Selector switch, SS; Failure reset pushbutton, RPB and Pilot lights, PL1 and PL2. The following components shall be mounted on the electrical mounting panel: Main circuit breaker, MB; Pump disconnect, PD; Control disconnect, CD; Starter, ST; Control relays, CR1 and CR2; terminal blocks, TB; and Intrinsically safe relays, ISR1 and ISR2. Intrinsically safe relays shall be housed in a separate compartment with metal barriers within the control panel. Metal barriers shall extend all the way from the back mounting panel to the hinged door of the panel. The main circuit breaker shall be externally operable. The door shall open only when the main breaker, CB, is in the "OFF" position.

Main circuit breaker, control disconnect and pump disconnect shall be single-pole, 120 V with trip rating as shown on the plans. The pilot lights, PL1 and PL2, shall be 120 V type LED pilot light. Starter shall be 2-pole, 240 V, NEMA Size 0, NEMA rated, line voltage starter. Starter shall have 120-volt coil, double-break silver contacts and manual reset, non-adjustable thermal overloads, set to trip between 115 and 125 percent of full load motor current, as quoted on the nameplate by the motor manufacturer. Selector switch, SS, shall be as specified under "Selector switch" in these special provisions. Terminal blocks shall be as specified under "Terminal Block" in these special provisions. Intrinsically safe relays shall be as specified under "Intrinsically Safe Relays" in these special provisions. Control relays shall be as specified under "Control relays" in these special provisions. Failure reset pushbutton shall be as specified under "Failure reset pushbutton" in these special provisions.

All the components mounted inside the enclosure shall be identified with nameplates having the abbreviation used on the plans (MB, CD, PD, ST, CR1, CR2, ISRI and ISR2). The panel, the operating handles of the circuit breakers, failure reset pushbutton and pilot lights shall have identification nameplate with inscription identifying their functions (LIFT PUMP CONTROL PANEL, MAIN, CONTROLS, PUMP, PUMP RUN, FAILURE RESET, HIGH ALARM). All letters shall have 7 mm height. Nameplates mounted on the back of the door shall be attached to the door using glue.

A wiring diagram encased between two heat fused laminated plastic sheets shall be provided with brass mounting eyelets and attached to inside the lift pump control panel.

Selector switch, SS

Selector switch shall be rotary action, double-pole, 2-position, 10-ampere, 120-volt switch. Switch contacts shall have an inductive pilot duty rating of 60 amperes (make), 6 amperes (break) and 10 amperes (continuous) at 120 volts and 35 percent power factor. Selector switch shall have legend plate marked HAND-AUTO.

Terminal Block

Terminal block shall be 30 A, 300 V, molded plastic with two or more mounting holes and two or more terminals in each cast block. The molded plastic shall have a high resistance to heat, moisture, mechanical shock, and electrical potential and shall have a smooth even finish. Each block shall have a molded marking strip attached with screws. Terminal blocks shall have tubular, high pressure clamp connectors.

Intrinsically Safe relays, ISR1 and ISR2

Intrinsically safe relays shall be latching type and completely self-contained solid-state relays approved for use with sensors in Class I, Division 1 locations. Relay shall be suitable for supply voltage of 120-volts AC, with 0.3-ampere, 120-volt rated, single-pole double-throw contact. Relay shall have maximum turn-on time of 5 milliseconds, and maximum output current of 100 microamperes at 28 volts, DC.

Control relays, CR1 and CR2

Control relay shall be 120-volt, AC, general purpose relay with 2-pole, double-throw, 10-ampere, 120-volt, AC, contacts. Relay shall be enclosed in clear plastic with 8-pin tube type plug base. Sockets for relay shall be barrier type, 8-contact relay socket with 10-ampere contacts and screw terminals.

Failure reset pushbutton, RPB

Failure reset pushbutton shall be heavy duty oil-tight and momentary pushbutton with one normally closed contact. The contact shall have an inductive pilot duty rating of 60 amperes (make), 6 amperes (break) and 10 amperes (continuous) at 120 volts and 35 percent power factor.

MISCELLANEOUS MATERIALS

Alarm sign

Alarm sign shall be sheet steel, not less than 1.2 mm thick (18-gage) with a baked enamel coating and shall have red letters, 50 mm in height, on a white background.

Nameplates

Nameplates shall be laminated phenolic plastic with white core and black front and back. Nameplate inscription shall be in capitals letters etched through the outer layer of the nameplate material.

PART 3.- EXECUTION

INSTALLATION

Plywood backing board.--Plywood backing board shall be securely fastened to walls or other vertical framing.

Existing switchboard and panelboards.--Provide new circuit breakers, where required to match existing type unless otherwise shown on the plans. Provide mounting hardware, bus straps, and related materials for proper circuit breaker installation. Provide new switchboard or panelboard identification nameplate with designation as shown for each panelboard. Remove existing nameplates where applicable. Provide new typewritten circuit directory reflecting changes made under the Contract.

Panelboard installation.--Set cabinets plumb and symmetrical with building lines. Train interior wiring as specified under "Conductor and Cable Installation" in "Basic Materials and Methods" of these special provisions. Touch-up paint any marks, blemishes, or other finish damage suffered during installation. Replace cabinets, doors or trim exhibiting dents, bends, warps or poor fit which may impede ready access, security or integrity.

Mounting height shall be 1.67 meters to the highest circuit breaker handle, measured above the finished floor.

Where “Space" is indicated on the plans, branch connectors, mounting brackets, and other hardware shall be furnished and installed for future breaker.

A typewritten directory under transparent protective cover shall be provided and set in metal frame inside each cabinet door. Directory panel designation for each circuit breaker shall include complete information concerning equipment controlled, including room number or area designated on the plans.

A wiring diagram encased between two heat-fused laminated plastic sheets shall be provided with brass mounting eyelets and attached to the inside of the ligft pump control panel.

Equipment identification.--Equipment shall be identified with nameplates fastened with self-tapping, cadmium-plated screws or nickel-plated bolts.

Nameplate inscriptions shall read as follows:

Item	Letter height, mm	Inscription
Panel D	6	PANEL D, 120/208 V, 3-PHASE
Panel W	6	PANEL W, 120/208 V, 3-PHASE

Alarm sign.--Alarm sign with the message as shown on the plans shall be fastened to the wall with at least six anchorage devices.

16.04 LIGHTING

GENERAL.--This work shall consist of furnishing, installing and connecting all lighting equipment in accordance with the details shown on the plans and these special provisions.

SUBMITTALS.--Manufacturer's descriptive information, photometric curves, catalog cuts, and installation instructions shall be submitted for approval. Any other data as requested by the Engineer shall also be submitted for approval.

PRODUCTS

Lighting fixture lamps

Lighting fixture lamps shall be type and size as shown on the plans. Lamps shall be General Electric, Phillips, Sylvania, or equal. Fluorescent lamps, unless otherwise noted, shall be 4100K tri-phosphor with a CRI of 70 or greater.

Ballasts

All fixtures shall be equipped with high power factor ballasts suitable for the line voltage and for the type, size and number of lamps required by the fixture. Fluorescent ballasts shall be UL Listed, Class P and ETL Certified ballasts with sound rating A. Fluorescent ballasts shall be high-frequency electronic ballasts with power factor greater then 0.95, nominal ballast factor of 0.88 unless specified otherwise, total harmonic distortion less than 20 percent, crest factor less than or equal to 1.7, complying with ANSI C 62.41 Category A for surge protection, and FCC Part 18 for interference. All metal fixtures with halide lamps shall be equipped with pulse start system.

Lighting fixtures

Lighting fixtures shall be as shown on the plans and as specified herein. Outdoor luminaires shall be listed and labeled "Fixture Suitable For Wet Locations."

F1

Stem-mounted, enclosed, industrial fluorescent fixture with two 32-watt T8 lamps, electronic ballast with fiberglass housing and listed suitable for wet locations. Ballast shall be rated for 0°C or lower. Fixture shall have neoprene gasket around the perimeter and secured with stainless steel lens latches. Lens shall be high impact clear acrylic. The fixture shall be Lithonia, DMW Series; Columbia, LUN4-2 Series ; or equal.

Alarm light, AL

Alarm light, AL, shall be fluorescent, weatherproof light fixture for use with threaded rigid conduit. Light fixture shall have guard and red globe. Lamp shall be two 9-watt, 120-volt standard service fluorescent lamp, complete with ballast and screw-on type base.

MH1

Outdoor, wall mounted, 100-watt, 120-volt, ceramic metal halide luminaire with integral ballast. The fixture shall be Holophane, Wallpack Series; Lithonia, TWH Series; or equal.

MH2

Outdoor, ceiling mounted, 100-watt, 120-volt, ceramic metal halide luminaire with integral ballast. The fixture shall be Daybrite CL1 Series; Lithonia, VR4C Series; or equal.

MH3

Outdoor, wall mounted, 100-watt, 120-volt ceramic metal halide luminaire with integral ballast and built-in photoelectric cell unit. The luminaire shall be Holophane, Wallpackette Series; Lithonia, TWR Series ; or equal.

MH4

Flood light luminaire, 175-watt, 120-volt, ceramic metal halide luminaire with integral ballast and yoke mount bracket. Lens shall be high impact clear tempered glass. The fixture shall be Lithonia TFL Series; GE, Powerflood Series; or equal.

Lighting Time clock

Time clock shall be a 120-volt, AC, solid state programmable electronic timer with power on-off and manual override. Time clock shall be able to program for a minimum of 2 independent schedules for any days of the week, in addition to being able to skip selected days. Time clock shall have minimum 2 single-pole, double-throw output contact shall be rated at not less than 16-ampere, 120-volt, AC. Time clock shall have a non-volatile memory that requires no back-up. Time clock shall include a factory installed field replaceable lithium battery which shall maintain accurate time keeping for a minimum of 8 years. Time clock shall be surface mounted in a NEMA Type1 enclosure.

EXECUTION

LIGHTING FIXTURES.--Lighting fixtures shall be mounted securely in accordance with the manufacturer's recommendations. Mounting methods shall be suitable for the particular type of ceiling or support at each location.

The Contractor shall provide all supports, hangers, spacers, channels, fasteners and other hardware necessary to support the fixtures.

Fixtures shall be set at the mounting heights shown on the plans, except heights shown shall be adjusted to meet conditions.

BALLASTS.--All fluorescent fixtures shall be equipped with high power factor ballasts suitable for the line voltage and for the type, size and number of lamps required by fixture.

All ballasts used in unheated areas inside the building shall be -20°C ballasts or less.